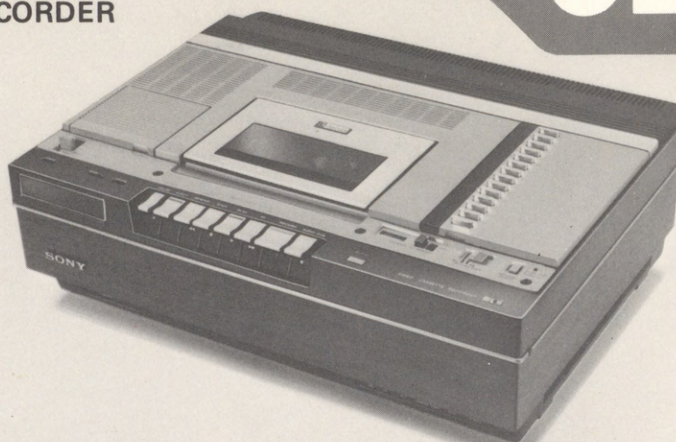




SPECIFICATIONS

General

Video recording system: Rotary two-head helical scanning

Video signal: EIA standard, NTSC color

Storage temperature: -20°C to $+60^{\circ}\text{C}$ (-4°F to $+140^{\circ}\text{F}$)

Operating temperature: 5°C to 40°C (41°F to 104°F)

Antenna: 75-ohm external antenna terminal for VHF
300-ohm external antenna terminals for UHF

Channel coverage: VHF channels 2 – 13
UHF channels 14 – 83

VHF output signal: Channel 3 or 4 (selectable)
75 ohms, unbalanced

Timer: only for recording
Electronic digital timer
12-hour-clock cycle
synchronized with the power frequency

Power requirements: 120V ac $\pm 10\%$, 60 Hz $\pm 0.5\%$

AC OUTLET: Unswitched max. 400W

Power consumption: 55W

Weight: 15.0kg (33 lb)

Dimensions: 493 x 162 x 376 mm (w/h/d)
(19 $\frac{3}{4}$ x 6 $\frac{1}{2}$ x 15 inches)

Video

Input: VIDEO IN: phono-type connector
1.0V(p-p), 75 ohms,
unbalanced, sync negative

Output: VIDEO OUT: phono-type connector
1.0V(p-p), 75 ohms,
unbalanced, sync negative

Signal-to-noise ratio: Better than 45dB

Audio

Input: AUDIO IN: mini jack
100k ohms, -10dB
MIC: mini jack
 -60dB , suitable for microphone
with 600-ohm impedance

Output: AUDIO OUT: mini jack
Less than 10k ohms, -5dB
(100k ohm load), unbalanced

Frequency response: β II : 50 – 10,000 Hz
 β III : 50 – 7,000 Hz

Signal-to-noise ratio: Better than 40dB

Tape transport

Tape speed: β II : 2.0cm/sec., β III : 1.33cm/sec.

Maximum recording time: 180 min. in β II mode, 270 min. in β III mode (with Sony L-750 cassette)

Fast forward time: Within 3 $\frac{1}{2}$ min. (L-500)

Rewind time: Within 3 $\frac{1}{2}$ min. (L-500)

Accessories supplied

Betamax videocassette tape

External antenna connector EAC-24 (75-ohm to 300-ohm matching transformer)

External antenna connector EAC-25 (300-ohm to 75-ohm matching transformer)

75-ohm coaxial cable with F-type connectors (2m)

300-ohm ribbon-type lead in (2m)

β etaScan control

Optional accessories

Extension cable RFC-8

Betamax video cassette tape L-250, L-500, L-750

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SECTION 1

PREPARATION FOR MECHANICAL SECTION CHECK, ADJUSTMENT, AND REPLACEMENT

1-1. DISASSEMBLY

1. Removal and Re-assembly of Cabinet

- | | |
|--|---|
| <p>(1) Cabinet Removal
Perform procedures ① to ⑥.</p> <p>(2) Cassette-lift Lid Assembly Removal
Perform procedures ⑦ to ⑨.</p> | <p>(3) Note on Assembly</p> <p>(i) When the cassette-lift lid is assembled, there must be a clearance of 1 to 2 mm between the lid and upper case as shown below.</p> |
|--|---|

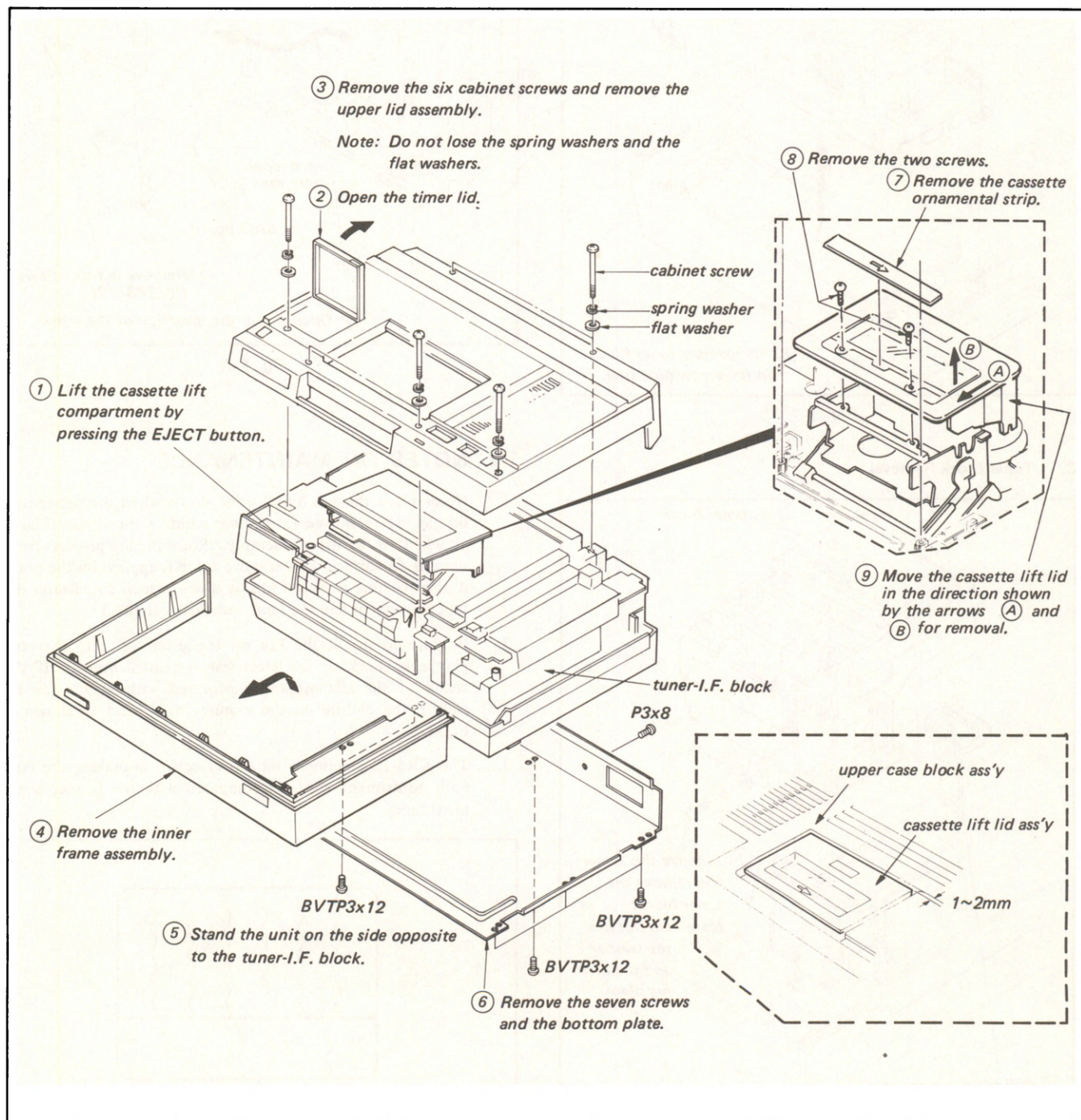


Fig. 1-1. Removal and re-assembly of cabinet

2. Tuner-IF Block Removal

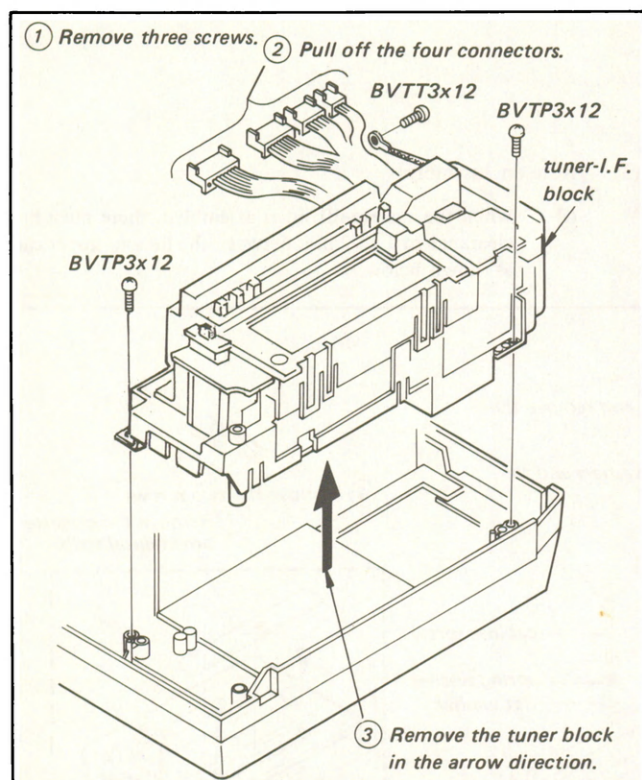


Fig. 1-2.

3. Timer Block Removal

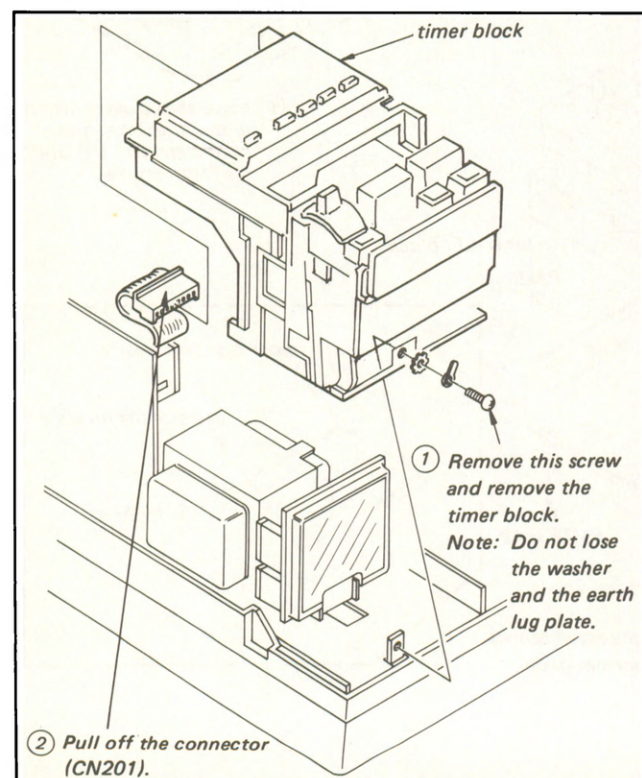


Fig. 1-3.

4. YC-4 and SA-3 Board Removal

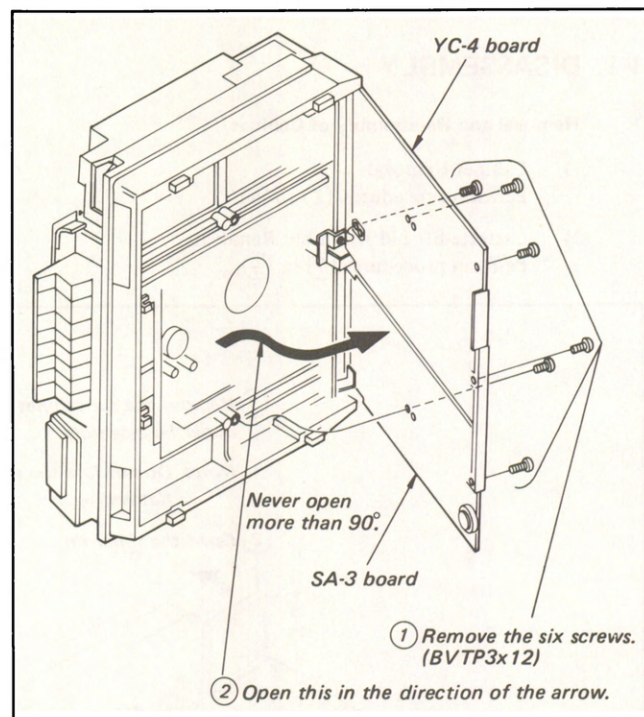


Fig. 1-4.

1-2. NOTES ON MAINTENANCE

1. Never place the machine upside down when the upper case lid has been removed from the machine, with the fan (black) attached on the drum assembly. (Since the fan projects from the chassis surface, an excessive force is applied on the drum if the machine is placed upside down, which could alter the tape movement and the tape interchangeability.)
2. Be sure to install the fan on the drum prior to the tape playback check or the electrical system alignment. If the check or the alignment is performed without the fan installed, the picture on the monitor may bend, as shown in Fig. 1-5.
3. The KR5-1S alignment tape is effective in making the tape path adjustment easy, as compared with the former alignment tapes.

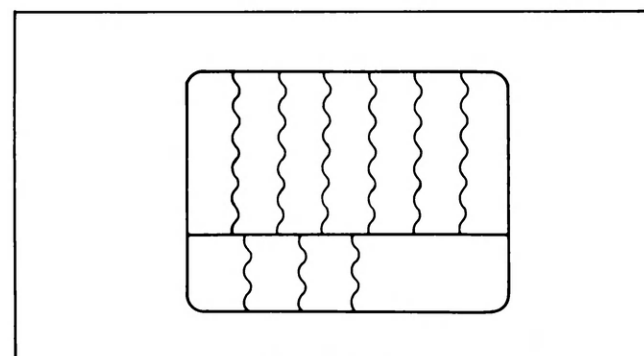


Fig. 1-5.

1-3. OPERATING RECORDER WITHOUT CASSETTE INSTALLED

1. To Set Up Threading Completion State Without Cassette and Cassette Lift Assembly.
(This state is called "STOP mode" in this guide.)
 - Push down the cassette detection lever until the threading ring stops. (See Fig. 1-6.)

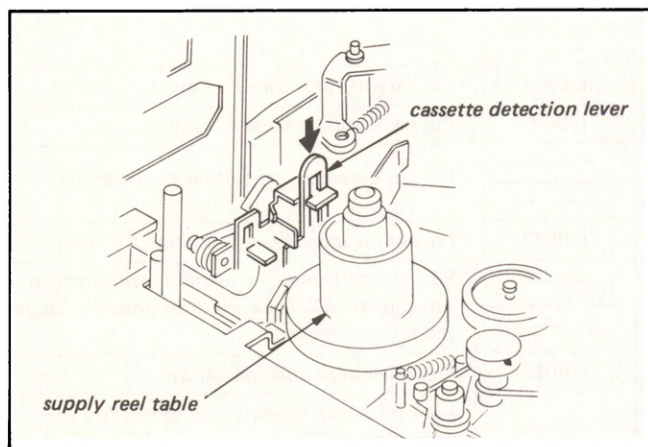


Fig. 1-6.

2. To Set Up PLAY, FAST FWD, And REWIND States Without Cassette Installed

- Capture the cassette detection lever with an alligator clip, or an equivalent, as shown in Fig. 1-7, to place the cassette detection switch, mounted on the chassis, into the ON state. Then a desired state of operation can be set up by depressing the function button for the desired state. But note that the PLAY function button must be depressed after performing the procedures for stopping the slack sensor operation described in Section 1-4.

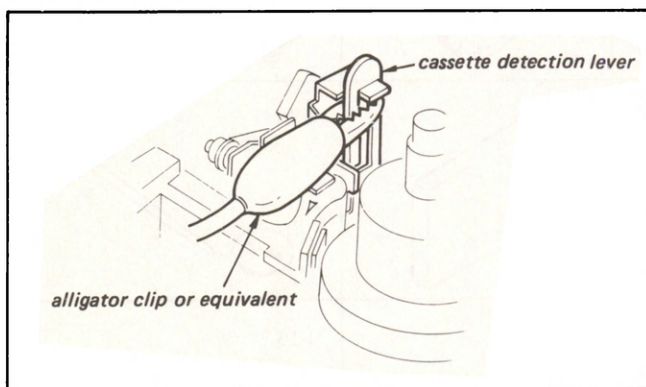


Fig. 1-7.

Note: Do not perform the cassette eject operation with the above method. The cassette eject operation without a cassette must be done by the procedure below.

3. To Set Up EJECT Mode Without a Cassette:
 - Keep pressing the EJECT button until the unthreading is completed.
4. To Set Up RECORD Mode Without a Cassette:
 - Capture the cassette detection lever with an alligator clip as shown in Fig. 1-7, manually depress the erasing protection plate as shown in Fig. 1-8, and perform the procedure in Section 1-4, "Stopping Slack Sensor Operation". Then depress the RECORD button or the AUDIO DUB button.

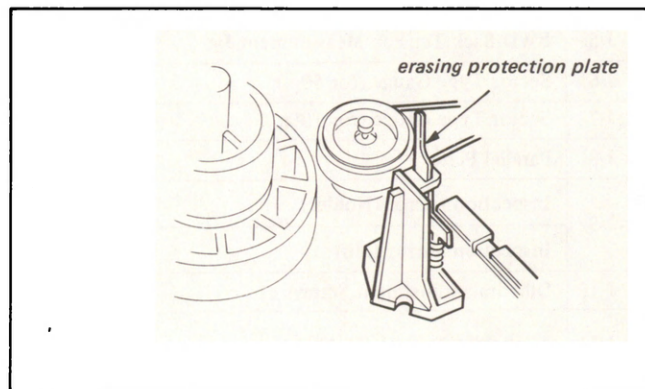


Fig. 1-8.

1-4. STOPPING SLACK SENSOR OPERATION

1. Insert a toothpick, or something like a matchstick whose point is sharpened, into the hole on the CN-4 board as shown in Fig. 1-9 to stop the movement of the slack sensor arm. A plastic pick would be preferred to the wooden one.

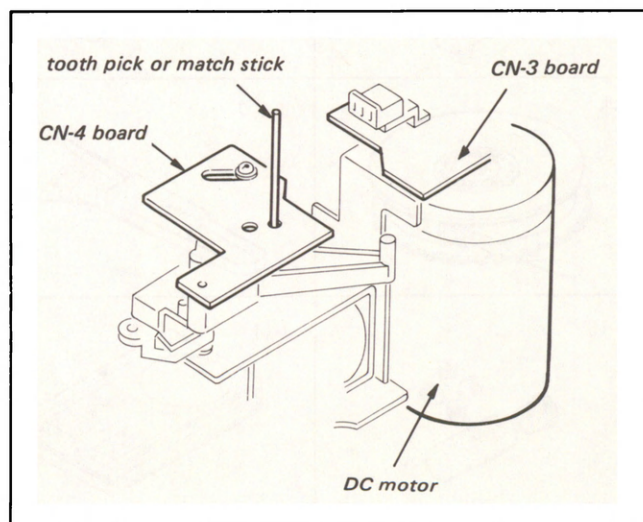
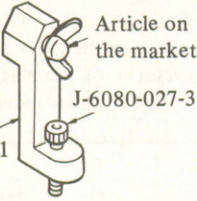
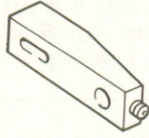
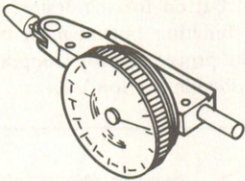
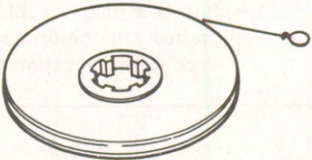
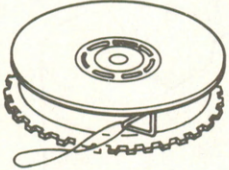
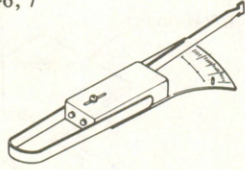
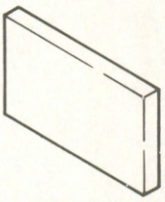
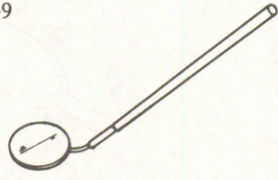
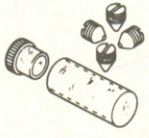
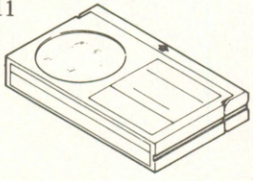
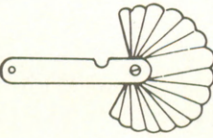
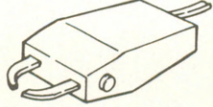
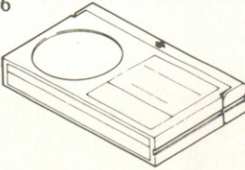


Fig. 1-9.

1-5. TOOLS AND JIGS REQUIRED

Ref. No.	Name	Code No.	Jig. No.	Use & Others
J-1	Upper Head Drum Eccentricity Alignment Jig	J-6080-027-1	SL-0027	For adjusting video head disk eccentricity (J-2 and J-3 are component parts of the SL-0012 which has been used as a jig.)
		J-6080-027-3		
J-2	J-6080-12-A	SL-0012		
J-3			Upper Head Drum Eccentricity Alignment Jig	
J-4	Reel Table Tension Gauge	J-6080-011-A	SL-0011	
J-5	FWD Back Tension Measurement Jig	J-6080-002-A	SL-0002	For back tension measurement
J-6	Sector Type Gauge (for 50g.)	7-732-050-20	_____	For back tension and torque measuremnts
J-7	Sector Type Gauge (for 100g.)	7-732-050-30	_____	
J-8	Parallel Plate	J-608-657-0A	SL-0657	For zenith adjustment of Audio/CTL head
J-9	Inspection Mirror (Holder)	7-723-902-01	_____	For tape path adjustment and tape movement adjustment and check. Place an order for holder and mirror together.
	Inspection Mirror (Mirror)	7-723-902-11	_____	
J-10	Dihedral Adjustment Screws	J-6080-013-1	SL-0013	For video head dihedral adjustment
J-11	Alignment Tape (KR5-1S)	8-969-995-71	_____	For overall adjustments such as tracking and picture quality
J-12	Cleaning Fluid	Y-2031-001-0	_____	For various cleaning
J-13	Chamois	2-034-697-00	_____	For various cleaning
J-14	Thickness Gauge	9-911-053-00	_____	For various cleaning
J-15	Head Degausser	Article on the market	_____	For degaussing video and audio heads (HE-2 or EH-3)
J-16	Cleaning Cassette Tape	8-888-004-00	_____	For video head cleaning

J-1 	J-2 	J-3 	J-4 
J-5 	J-6, 7 	J-8 	J-9 
J-10 	J-11 	J-12 	J-13 
J-14 	J-15 	J-16 	

SECTION 2

PERIODIC CHECK AND MAINTENANCE

- It is recommended that the following periodic check and maintenance be performed for obtaining the full function and performance of the machine and extending the lives of the machine and tape.

2-1. MAINTENANCE AFTER REPAIR

The following maintenance items must be performed after repair of the machine without regard to the operating hours of the machine.

- Cleaning of the video head disk assembly
 - Press chamois saturated with the cleaning fluid or isopropyl alcohol lightly on the video head disk assembly and turn the fan on the drum slowly by hand for cleaning. (Never try to clean the video head disk assembly with the motor running.)
 - Never move the chamois vertically against the head tips for cleaning, or the head tips will be damaged.

- Cleaning of the tape movement system
 - Clean the surfaces which the tape contacts during its movement (the tape guides, drum assembly, capstan, and pinch roller) with chamois saturated with the cleaning fluid or isopropyl alcohol.
- Cleaning of the driving system
 - Clean the driving elements (such as belts, idlers, and reel table surfaces) with a piece of cloth saturated with the cleaning fluid or isopropyl alcohol.

2-2. PERIODIC CHECK ITEMS

Perform the maintenance and check listed on the table below, according to user's operating hours.

		Operating Hour (H)	○ Cleaning ◎ Lubrication ★ Replacement ☆ Confirmation										Remarks
Maintenance & Check		Replacement Part No.	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	
Tape Movement System	Cleaning of tape movement system	_____	○	○	○	○	○	○	○	○	○	○	This cleaning must be done whenever a repair is made.
	Cleaning & degaussing of ACE ass'y	_____	○	○	○	○	○	○	○	○	○	○	
	Cleaning, degaussing & replacement of video head disk ass'y	A-6762-031-A	○	★	○	★	○	★	○	★	○	★	The life of a head varies, depending on operational conditions and methods.
Driving System	Lubrication to thrust retainer	_____	—	◎	—	◎	—	◎	—	◎	—	◎	Apply a drop of oil (such as sewing machine oil) on each of upper and lower bearings.
	Lubrication to thrust bearing (under reel table)	_____	—	—	◎	—	—	◎	—	—	◎	—	Remove reel table and apply a drop of oil (such as sewing machine oil) on thrust bearing.
	Cleaning & replacement of capstan belt	3-661-708-00	○	○	★	○	○	★	○	○	★	○	•Cleaning must be done whenever repair is made.
	Cleaning & replacement of belts other than capstan belt	_____	○	○	○	○	○	○	○	★	○	○	•Replacement must be done depending on operating hours on the table, or every two years.
	Replacement of FWD limiter	X-3659-321-0	—	—	★	—	—	★	—	—	★	—	
	Cleaning of iron core and opening of solenoid	_____	—	—	—	○	—	—	—	○	—	—	Wipe iron core and opening of solenoids with a dry cloth.
Performance Confirmation	Abnormal sound	_____	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Adjust or replace the section which makes abnormal sound.
	Measurement of FWD back tension	_____	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to Section 3-19. Specified value: 40 to 50g. (when measured with jig tape)
	Confirmation of brake system	_____	—	☆	—	☆	—	☆	—	☆	—	☆	Confirmation must be made according to Section 3-18.
	Confirmation of record & playback functions	_____	☆	☆	☆	☆	☆	☆	☆	☆	☆	☆	Perform the confirmation whenever repair is made.

- Belts other than capstan belt

FWD belt	3-653-324-00
EJECT belt	3-659-397-00
FF belt	3-659-471-00
Counter belt	3-661-565-00

(Note on Overhaul)

A part replacement must be done in the overhaul operation, referring to the listed items. The replacement periods of the motor and the head which are not included in the chart items are as follows.

Full erase head about 4,000 operating hours
Capstan motor about 2,000 operating hours

2-3. OTHERS

(1) Lubricating Oil

- Be careful in applying oil to any parts. Do not permit the oil to coat any surface that is touched by the tape, heads, or drive belts.
- Be sure to use SONY oil (or equivalent) for lubrication. (Various troubles will be caused, if a different viscosity oil is used.)

SONY Oil: Part No. 7-661-018-01

(Mitsubishi Diamond Oil #440)

**OR THE EQUIVALENT OF SEWING MACHINE
TYPE OIL**

- Use the oil without dust or other foreign material for the bearing lubrication. (If an oil including dust and others is used, friction and burning of the bearing are apt to occur)
- The quantity of "a drop of oil" is about the quantity that will attach to the tip of a 2 mm diameter stick, as shown in the figure.

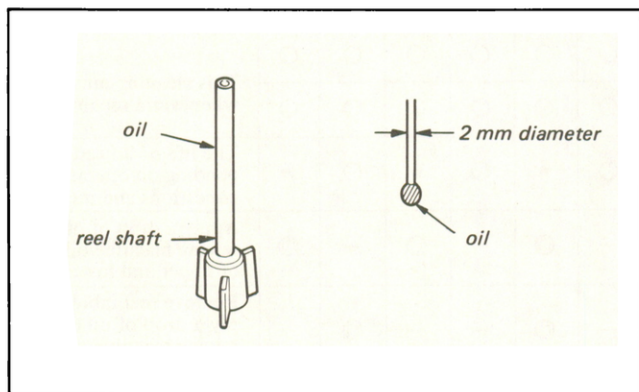


Fig. 2-1.

SECTION 3

CHECK, ADJUSTMENT, AND REPLACEMENT PROCEDURES

3-1. REPLACEMENT OF VIDEO HEAD DISK ASSEMBLY AND ECCENTRICITY ADJUSTMENT

1. Remove the video head disk assembly, following Steps ① to ⑥ shown in Fig. 3-1.

Note: • For removing fan ①, hold video head disk assembly ⑥ (without touching heads) and turn the fan in a counterclockwise direction.

- Never loosen the two setscrews that fasten the lower flange to the drum shaft.
- Never loosen the lower two screws of the drum support.
- Prior to installing the video head disk assembly ⑥, clean surfaces A and B with a piece of cloth saturated with methanol or isopropyl alcohol.

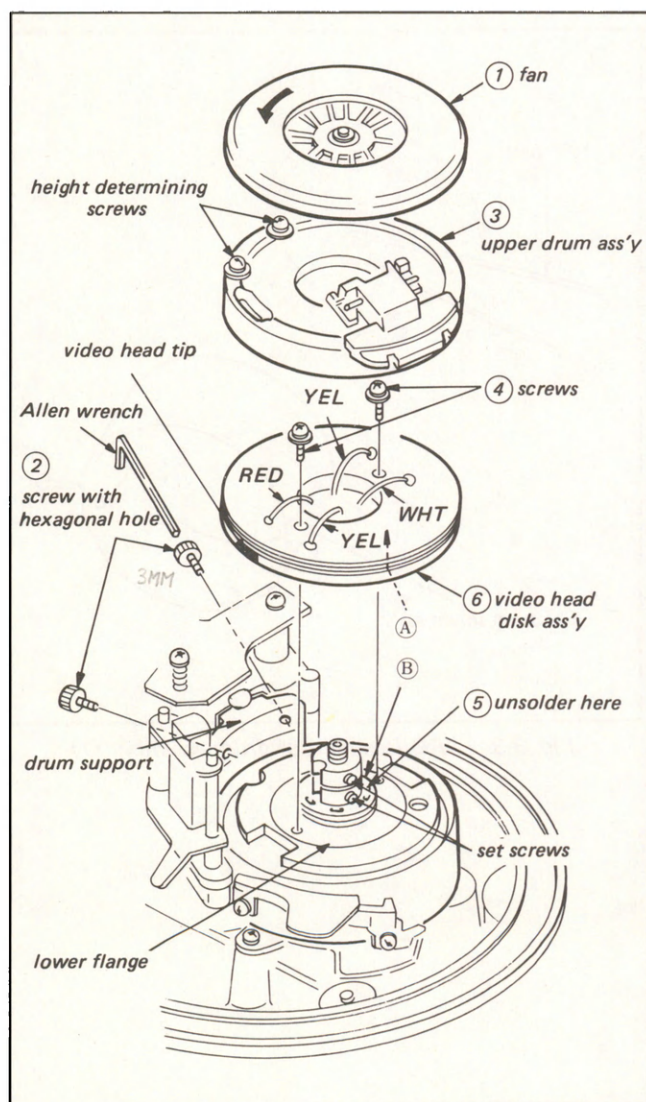


Fig. 3-1. Replacement of the video head disk assembly

2. Install the video head disk assembly tentatively (with two screws only finger-tight) and perform the eccentricity adjustment.
 - (i) Combine adjusting fixture parts ①, ②, and ③ as shown in Fig. 3-2. Set the combined fixture on the machine by mounting the eccentricity gauge assembly in the adjustment hole. See Fig. 3-2.

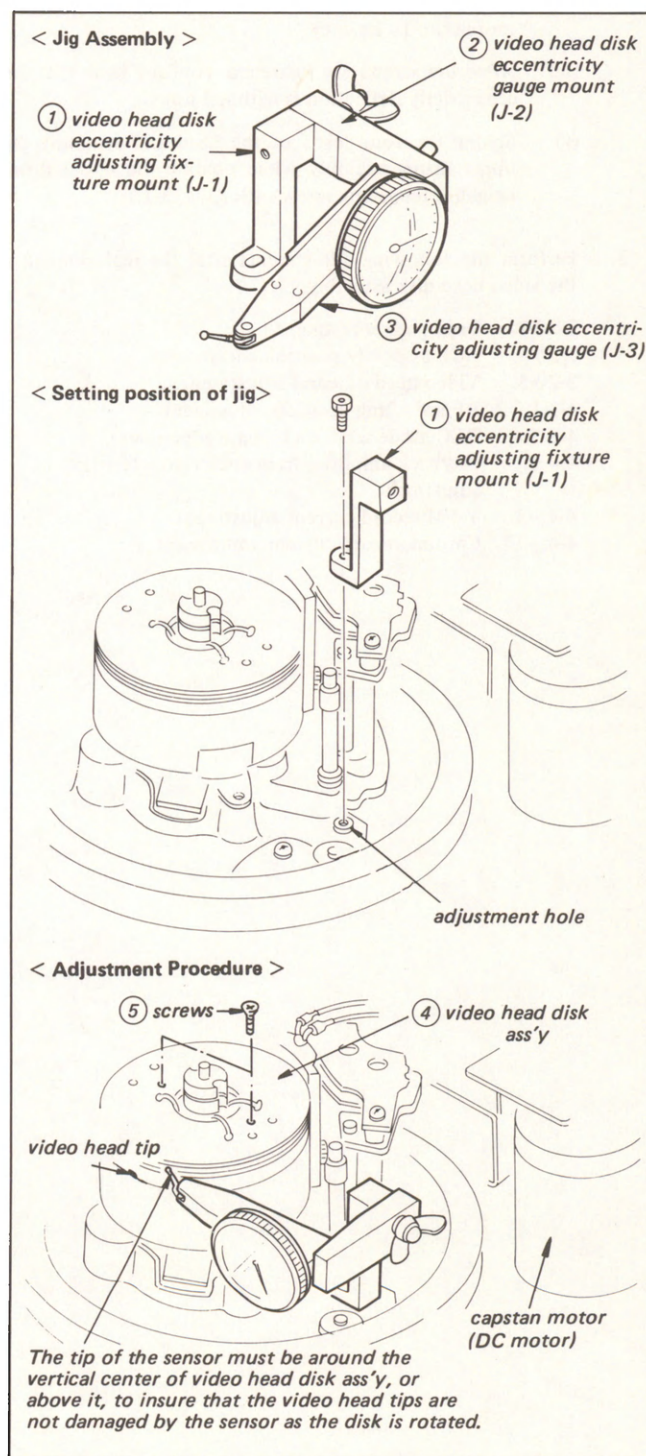


Fig. 3-2. Eccentricity adjustment of the video head disk assembly

- (ii) Turn the shaft of the drum counterclockwise slowly with the fingers and adjust the video head disk position so that the variation in the reading of the drum eccentricity adjusting gauge is within $5\text{ }\mu\text{m}$ during each turn of the drum, by very gently tapping a screwdriver whose blade-tip is against the inner circumference of video head disk assembly (4).
 - (iii) Tighten the screws (5) that secure the video head disk assembly (4) alternately and gradually after the eccentricity adjustment is completed. (tightening torque: more than 10 kg.cm .)
 - (iv) After the screws are tightened, confirm again that the eccentricity deflection is within $5\text{ }\mu\text{m}$.
 - (v) Solder the four leads of the head and remount the upper drum assembly while holding the upper drum height determining screws. (See Fig. 3-1.)
3. Perform the following adjustments after the replacement of the video head disk assembly.
 - 3-20-1. Tape path adjustment
 - 3-20-4. ACE assembly position adjustment
 - 3-20-5. Video head dihedral adjustment
 - 4-3-1.-2. RF switching position adjustment
 - 4-3-3.-3. REC mode servo lock phase adjustment
 - 4-4-1. Playback amplifier frequency characteristic adjustment
 - 4-4.-16. Y-FM record current adjustment
 - 4-4.-17. Chroma record current adjustment

3-2. REPLACEMENT OF DRUM ASSEMBLY

1. Stand the machine on its left side. Open the YC-4 and SA-3 boards. (Refer to Section 1-1-4.)
2. Remove FF belt (1) and drum shield (2) shown in Fig. 3-3.
3. Remove two screws (1) and connectors (2) and (3) shown in Fig. 3-4. The drum assembly can then be removed, by pulling it up.
4. Loosen the rotor assembly by inserting a long-nose pliers or a screwdriver into the two rotor holes shown in Fig. 3-5 and removing the N5 ϕ nut and SW5 ϕ washer. Pull off the rotor assembly.
5. Remove the screw mounting the stator assembly (shown in Fig. 3-5) and pull off the stator assembly.
6. Install the rotor assembly and the stator assembly (removed in Steps 4 and 5) onto the new drum assembly.

Note: Install the stator assembly so that the 3P connector on the stator assembly fits into the slot of the shield case assembly.

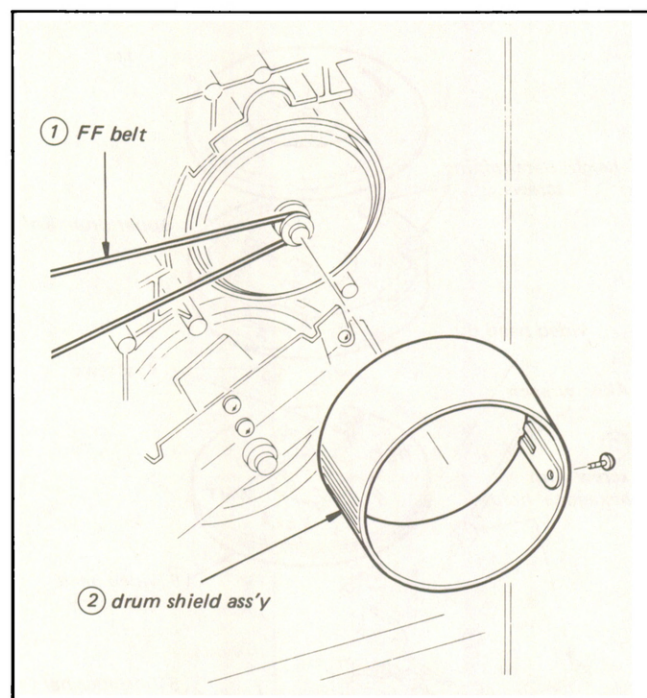


Fig. 3-3. Replacement of drum assembly (1)

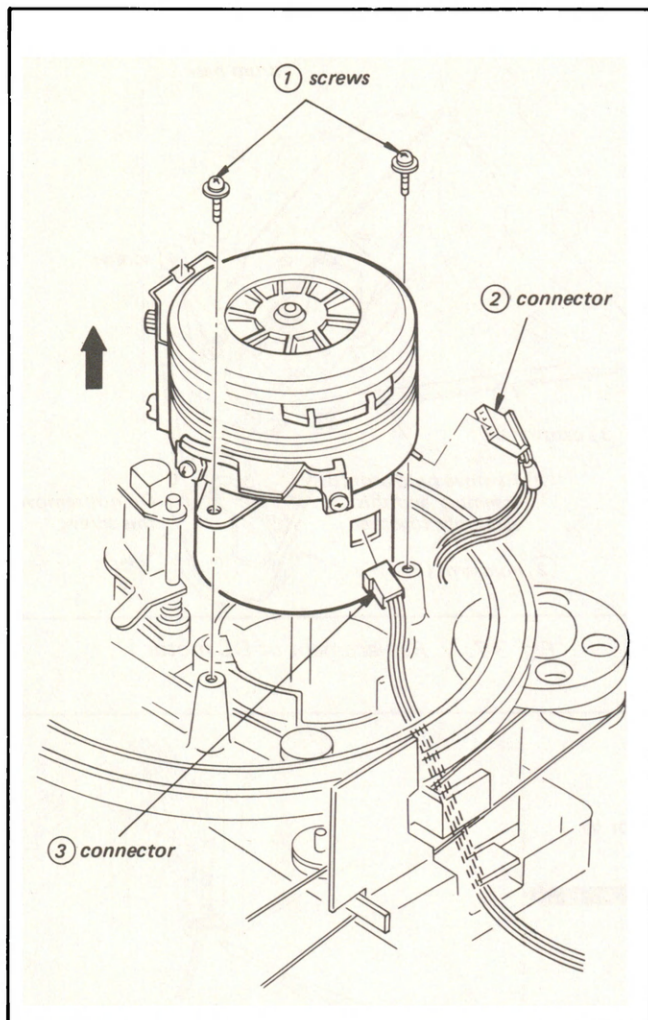


Fig. 3-4. Replacement of drum assembly (2)

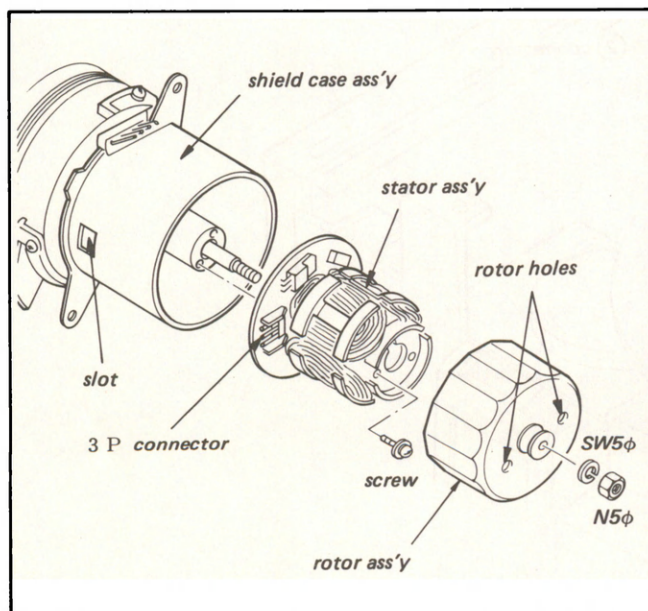


Fig. 3-5. Replacement of drum assembly (3)

7. Install connector (A), the drum shield assembly, and the FF belt on the drum assembly.

Note: 1. The bottom edge of the drum shield must be flush with the bottom edge of the shield base assembly.

2. Do not tighten the drum shield set screw too much or housing will distort.

Pull the leads of connector (A) in the arrow direction and dress the leads so that the leads do not touch the EJECT belt. (See Fig. 3-6.)

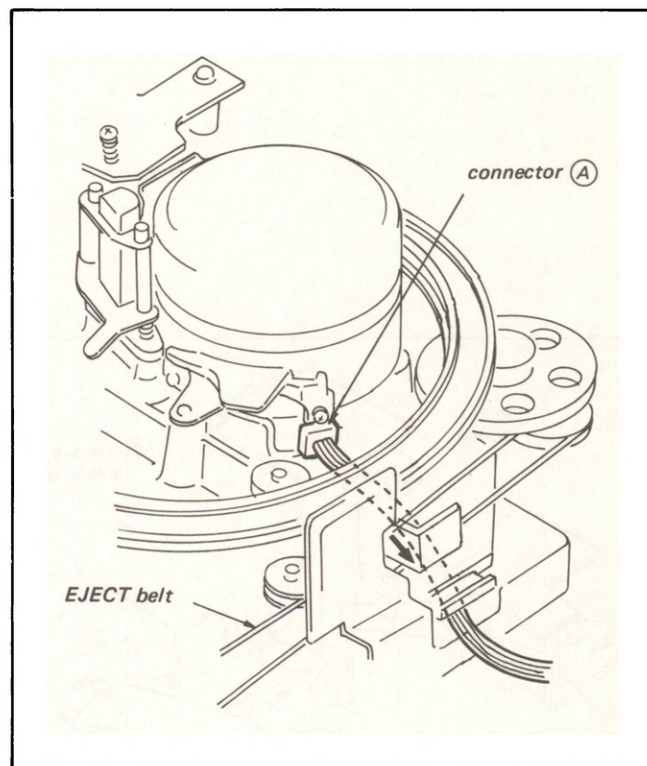


Fig. 3-6. Replacement of drum assembly (4)

8. Perform the following adjustments after the replacement.

- 3-20-1. Tape path adjustment
- 3-20-4. ACE assembly position adjustment
- 4-3-1. Drum servo system adjustment
- 4-4-1. Playback amplifier frequency characteristic adjustment
- 4-4.-16. Y-FM record current adjustment
- 4-4.-17. Chroma record current adjustment

3-3. REPLACEMENT OF CAPSTAN DC MOTOR

1. Stand the machine on its left side. Open the YC-4 and the SA-3 boards. (Refer to Section 1-1-4.)
2. Remove the DC motor from the drum base, following Steps ① to ④ shown in Fig. 3-7.
3. Take out the DC motor, following Steps ① to ③ shown in Fig. 3-8.

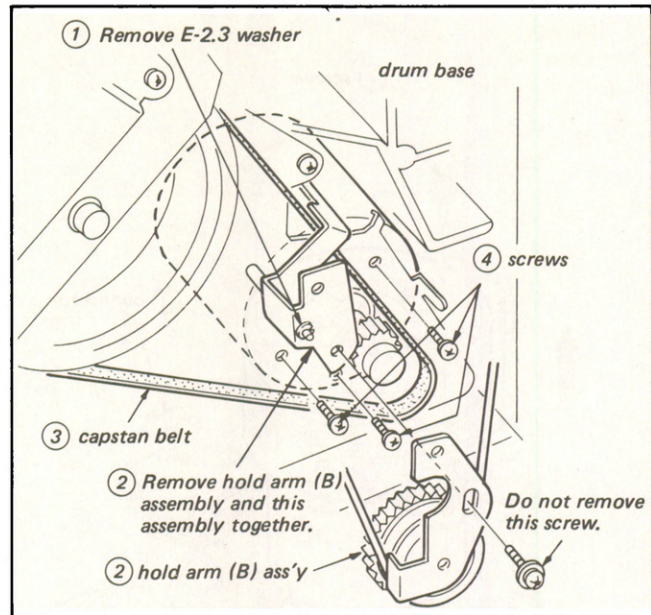


Fig. 3-7. Replacement of DC motor (1)

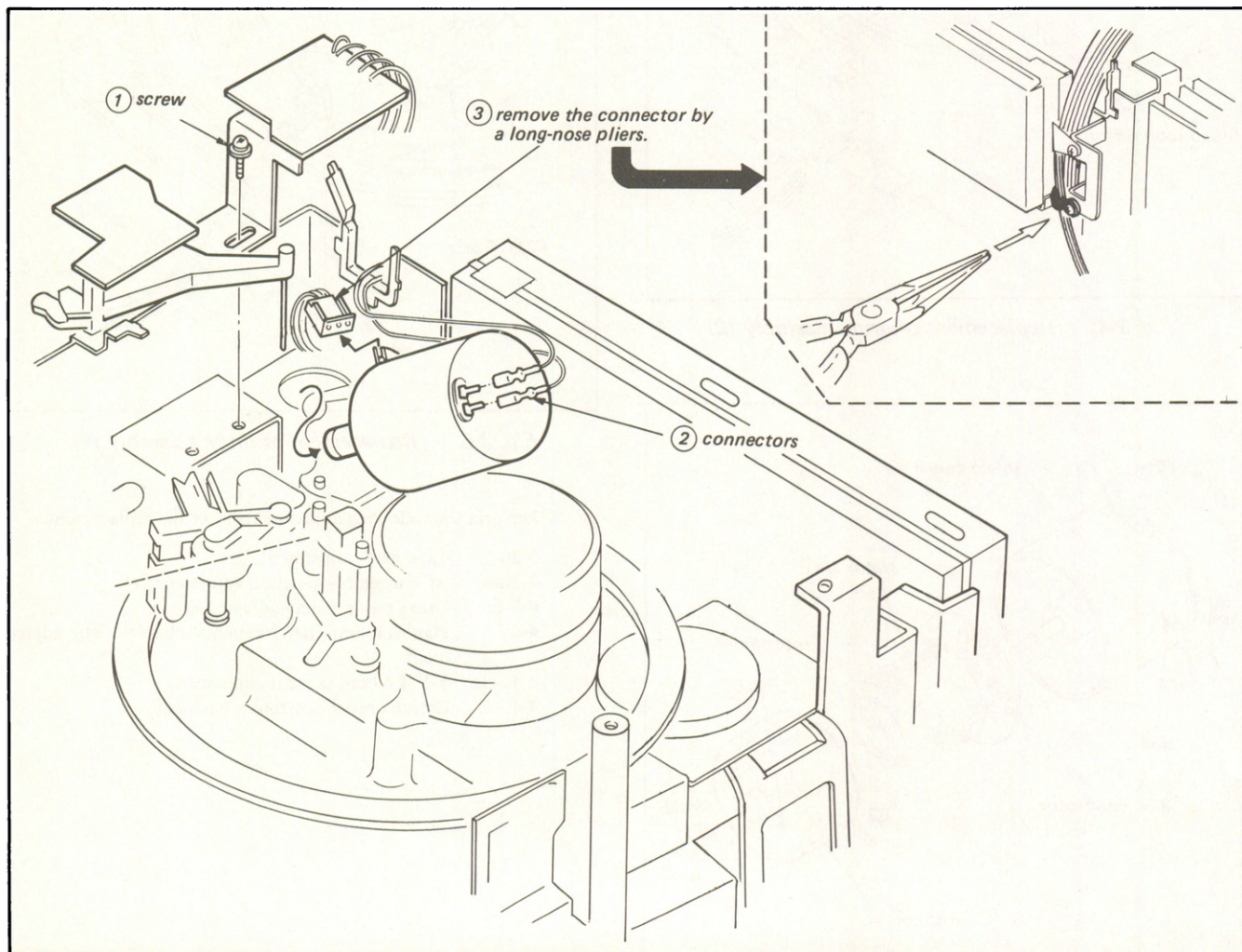


Fig. 3-8. Replacement of DC motor (2)

4. Remove capstan shield ① and motor pulley assembly ② from the defective motor and install them on the replacement motor. (See Fig. 3-9.)

Note: Install motor pulley assembly ② so that there is a clearance of approx. 1.5mm between the motor pulley assembly and capstan motor ③.

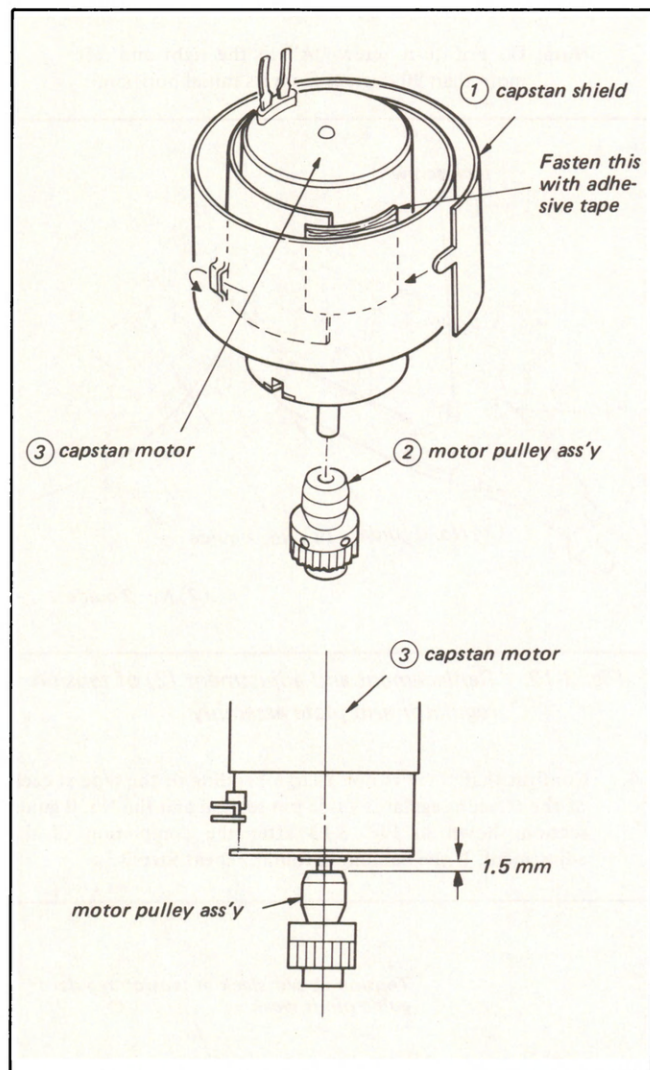


Fig. 3-9. Replacement of DC motor

5. Perform the following adjustment after the replacement.
- 4-3-2.(2) Capstan free speed adjustment

3-4. REPLACEMENT AND ADJUSTMENT OF TENSION REGULATOR ARM PLATE ASSEMBLY AND TENSION REGULATOR BAND ASSEMBLY

The tension regulator arm replacement must be done carefully, following the procedure below, because the tape interchangeability is much affected by the tension regulator arm operation.

3-4-1. When Tension Regulator Band Assembly is Replaced;

1. The tension regulator band assembly can be removed after removing screw ① and hook ② shown in Fig. 3-10.
2. Perform the tension regulator FWD position adjustment described below after the replacement.
 - (i) Place the machine, without an inserted cassette, into the STOP mode. (Refer to Section 1-3.)
 - (ii) Set up the PLAY mode.
 - (iii) Move the tension regulator band assembly ③ in the arrow direction as shown in Fig. 3-10 so that the positional relationship of the brake band assembly is as shown (A) in Fig. 3-10. Then tighten screw ①.
 - (iv) Perform the FWD back tension adjustment, Section 3-19, after the replacement.

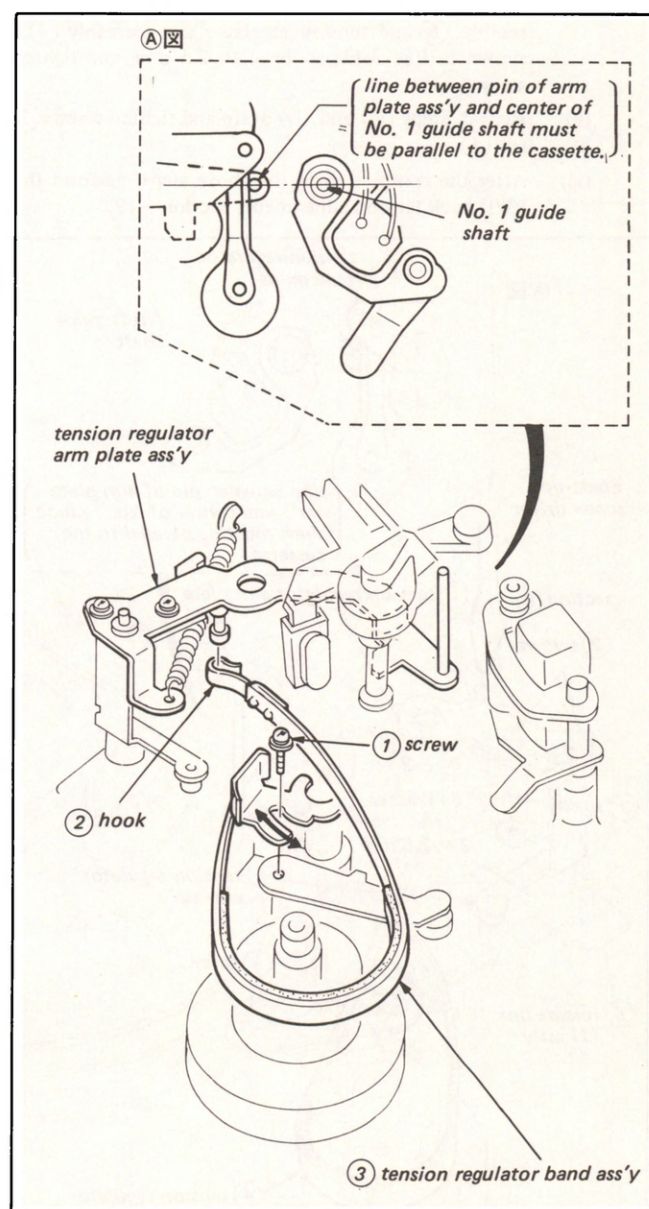


Fig. 3-10. Replacement and adjustment of the tension regulator band assembly

3-4-2. When Tension Regulator Arm Plate is Replaced:

1. The tension regulator arm plate can be removed after removing two screws (2), spring (3), E-3 (8) and washer (9) shown in Fig. 3-11.
2. After the replacement, perform the tension regulator FWD position adjustment as follows.
 - (i) Set up the STOP mode without an installed cassette. (Refer to Section 1-3.)
 - (ii) Set up the PLAY mode.
 - (iii) Loosen screw (5) that mounts tension regulator band assembly (4) as shown in Fig. 3-11. Move tension regulator band assembly (4) in the arrow direction, and tighten screw (5) tentatively when the condition shown in (A) is set up.
 - (iv) Insert a standard blade-tip screwdriver into section (B), adjust the clearance between release link (1) assembly (6) and tension regulator arm assembly (7), shown in Fig. 3-11, to be 2 to 2.5 mm, and tighten screw (2).
 - (v) Repeat Steps (iii) and (iv) again and tighten screws (2) and (5).
 - (vi) After the completion of the above steps, perform the FWD back tension adjustment, Section 3-19.

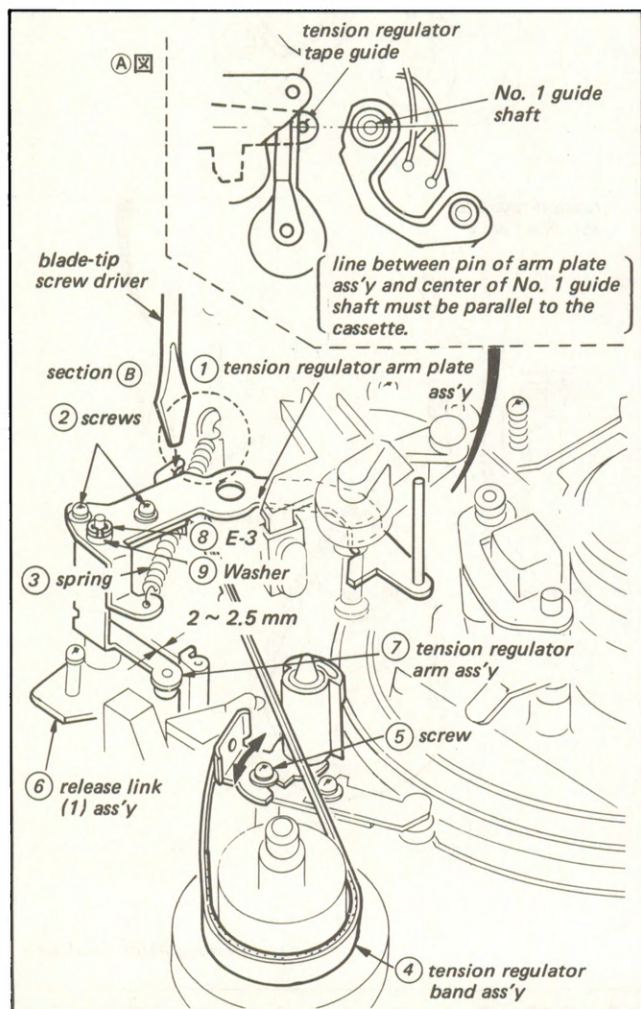


Fig. 3-11. Replacement and adjustment (1) of tension regulator arm plate assembly

3. Play back the 1 MHz segment of the alignment tape (KR5-1S). Loosen the lock screw and adjust screw "A" in Fig. 3-12 so that the RF waveform becomes that (see the waveform in the tape path adjustment, Section 3-20-1.) when the TRACKING knob is turned to the right and left from its center detent position and so that the tape is not apart from the flanges of guides (1), (2) and (3) shown in Fig. 3-12 and there is not a large tape curl at the guides.

Note: Do not turn screw "A" to the right and left more than 90 degrees from its initial position.

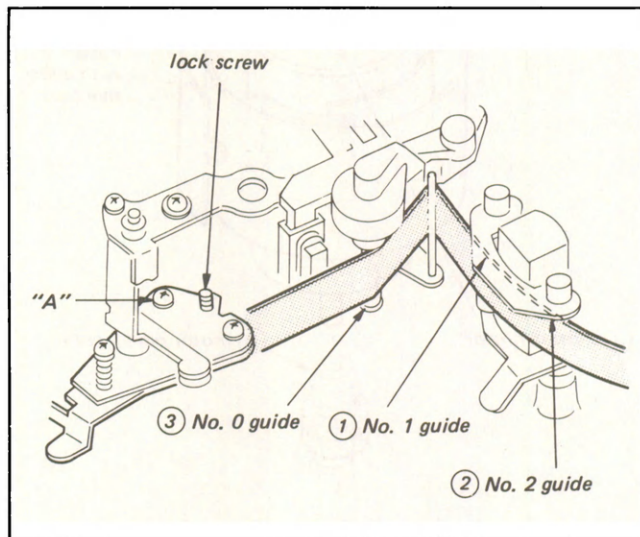


Fig. 3-12. Replacement and adjustment (2) of tension regulator arm plate assembly

4. Confirm that there is not a large bending of the tape at each of the tension regulator guide pin section and the No. 0 guide section shown in Fig. 3-13 after the completion of the adjustment. If the bending is found, repeat Step 3.

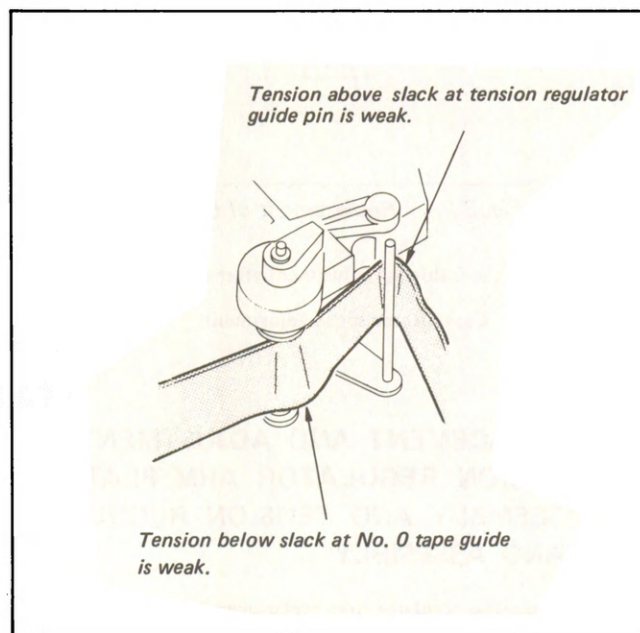


Fig. 3-13. Replacement and adjustment (3) of tension regulator arm plate assembly

3-5. REPLACEMENT OF CASSETTE-LIFT ASSEMBLY

1. Set up the unthreading state and remove the cassette-lift assembly by loosening four screws.
2. Install the cassette-lift assembly so that the reel tables and the reel holes on the cassette holder from concentric circles. (See Fig. 3-14.)
3. Insert the cassette into the cassette-lift compartment after the installation, set up the EJECT mode to perform unthreading after setting up the STOP mode, and confirm that the cassette-lift compartment assembly lifts. Make the confirmation after performing the lid opener position adjustment in Section 3-9.

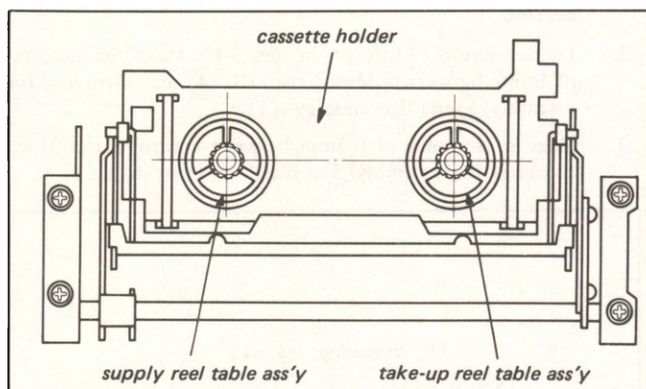


Fig. 3-14. Replacement of cassette-lift assembly

3-6. ADJUSTMENT OF REEL TABLE HEIGHT

- Since the reel table height serves as the reference of the tape movement system, the height must be adjusted carefully after the reel table replacement.
1. Measure the height of the reel table with a slide caliper prior to the removal of the old reel table. (See Fig. 3-15.)
 2. Place a new reel table, measure its height, and adjust height by adding or removing the adjusting spacer so that the difference in the heights of the former and new reel tables is within 0.1mm. (See Fig. 3-15.)

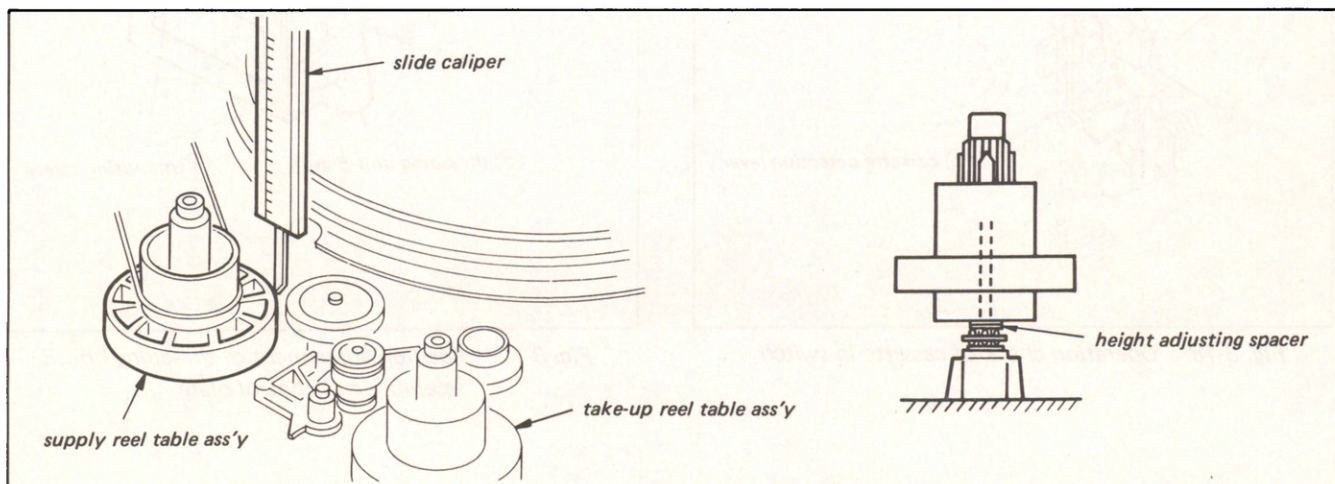


Fig. 3-15. Adjustment of reel table height

3-7. POSITION ADJUSTMENT, PAUSE SOLENOID

1. Set up the STOP mode without the cassette installed. (Refer to Section 1-3.)
2. Set up the REC PAUSE state so as to place the solenoid into the energized state.
3. Loosen the screws (1) that mount the solenoid and move the solenoid in the direction indicated by screw (A) as shown in Fig. 3-16 so that a clearance is made between the brake rubber and the take-up reel table.
4. Then move the solenoid in the direction shown by arrow (B) and tighten screws (1) after the solenoid is moved further 0.8 mm in the (B) arrow direction from the point where the brake rubber begins to touch the take-up reel table assembly.

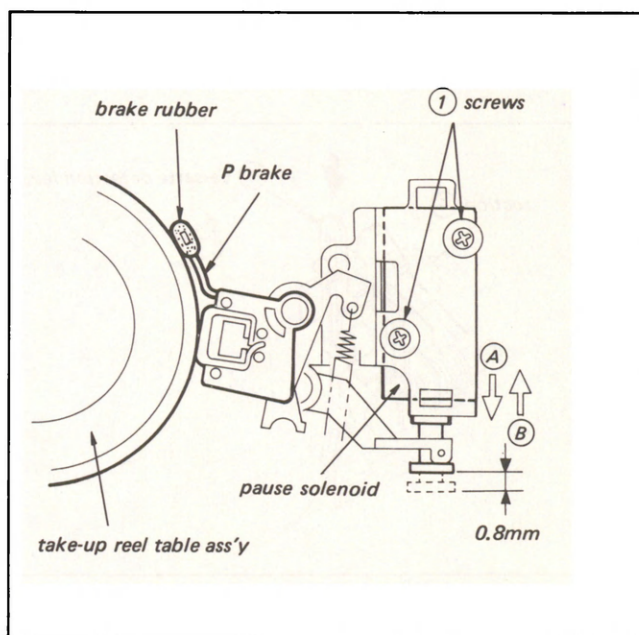


Fig. 3-16. Position adjustment of pause solenoid (Stroke adjustment)

3-8. ADJUSTMENT OF THREADING AND UNTHREADING

3-8-1. Operation Check of Cassette-in Switch

1. Set up the unthreading completion state without an inserted cassette and turn off the power.
2. Set section (A) as shown in Fig. 3-17.
3. Confirm that the microswitch mounted on the underside of the machine does not turn on when the cassette detection lever (1) is pushed in the arrow direction.
4. Set section (A) as shown in Fig. 3-18.
5. Confirm with a click that the microswitch mounted on the underside of the machine turns on when the cassette detection lever (1) is pushed in the arrow direction.
6. Adjust the mounting position of cassette detection (1) so that it moves more than 1.5mm further from the point where the clock is heard.

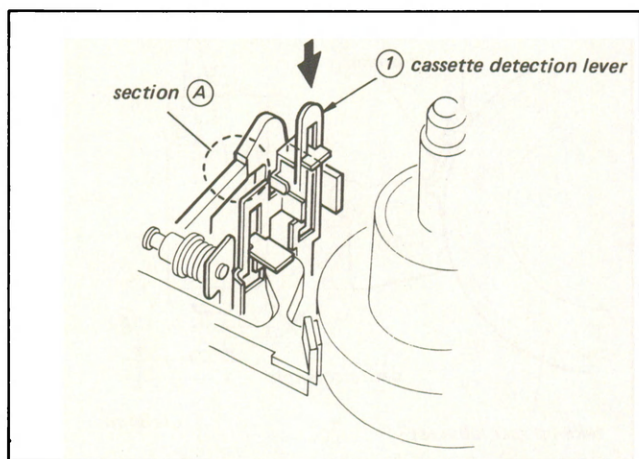


Fig. 3-17. Operation check of cassette-in switch

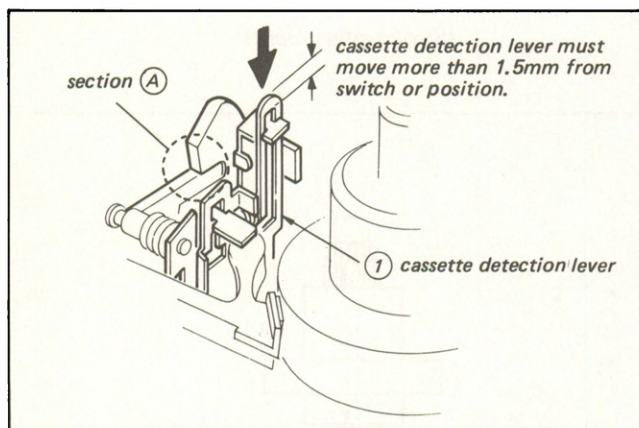


Fig. 3-18. Operation check of cassette-in switch

Note: • The problem where the cassette-lift assembly does not lock occurs if the microswitch turns on in the condition shown in Fig. 3-17.

- The problem where the modes other than the EJECT mode cannot be set up occurs if the microswitch does not turn on in the state shown in Fig. 3-18.

3-8-2. Position Adjustment of Threading Unit B Assembly and Control Plate

1. Push down the cassette detection lever with fingers to perform the threading operation and release the lever when the threading ring assembly (5) shown in Fig. 3-19 has turned 90 degrees.
2. Loosen screws (1) shown in Fig. 3-19. Make the clearance (0.2mm) between midway gear (B) (4) and threading ring assembly (5) and tighten screws (1).
3. Make a clearance of 0.5mm between control plate (3) and threading ring assembly (5) and tighten screw (6).

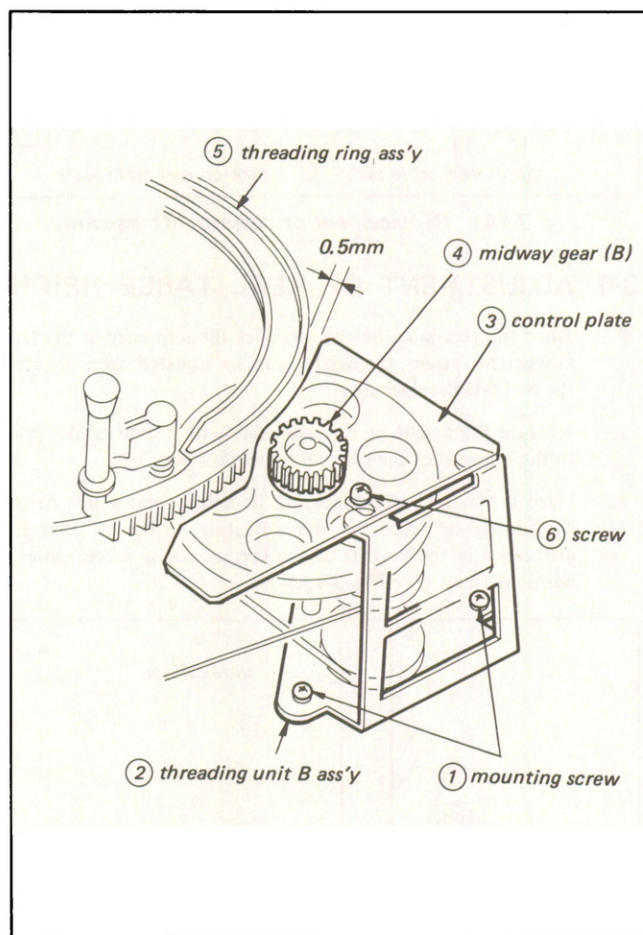


Fig. 3-19. Position adjustment of threading unit B assembly and control plate

3-8-3. Position Adjustment of Gear Pulley Hold Arm Assembly

1. Loosen screw (1) shown in Fig. 3-20, adjust the position of the gear pulley hold arm assembly so that the clearance between the motor pulley assembly (2) and the gear pulley (3) is 0.3 mm, and tighten screw (1).
brake

3-8-4. Adhesion of Brake Shoe

1. Glue the brake shoe to the groove on the brake arm as shown in Fig. 3-20.

Note: If the brake shoe is not glued in the right position, it is possible for the brake shoe to touch the capstan belt. If the shoe is removed, there is a possibility of the occurrence of an abnormal sound at the initial stage of the unthreading.

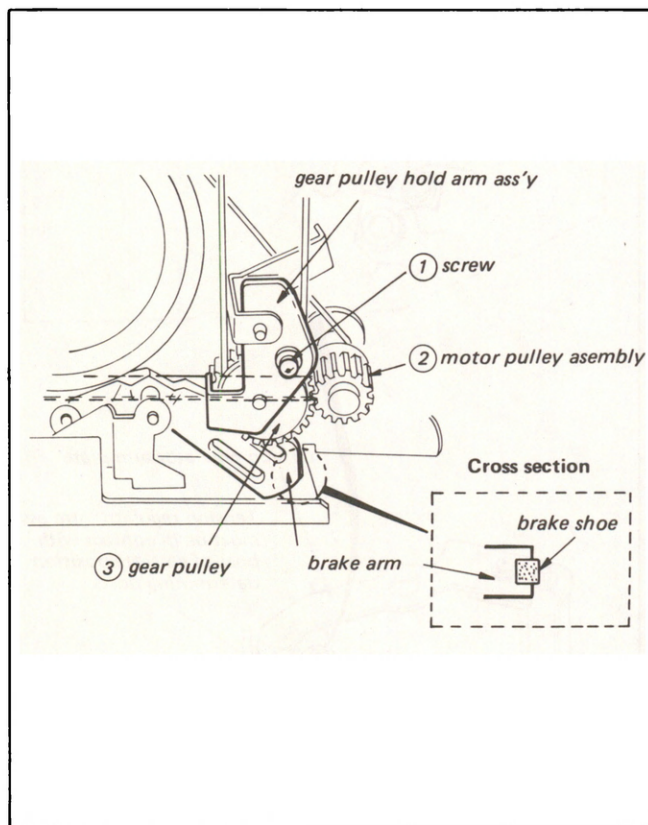


Fig. 3-20. Position adjustment of gear pulley hold arm assembly

3-8-5. Clearance Adjustment of Cassette Lift Assembly Arm

- Since a poor adjustment of the clearance causes the condition that the cassette lift assembly arm (2) is in strong contact with the threading ring assembly (3), the threading and unthreading cannot always be performed smoothly. When the clearance is larger than the specified value, the lock of the cassette lift assembly comes loose and the cassette lift assembly lifts during the unthreading, damaging the tape.
1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
 2. Loosen screw (1) and adjust the position of the cassette lift assembly arm (2) with the thickness gauge so that the clearance between the cassette lift assembly arm (2) and the threading ring (3) satisfies the specification (0.2 mm to 0.5 mm). (See Fig. 3-21.)
 3. Check the value again after the screw is tightened.

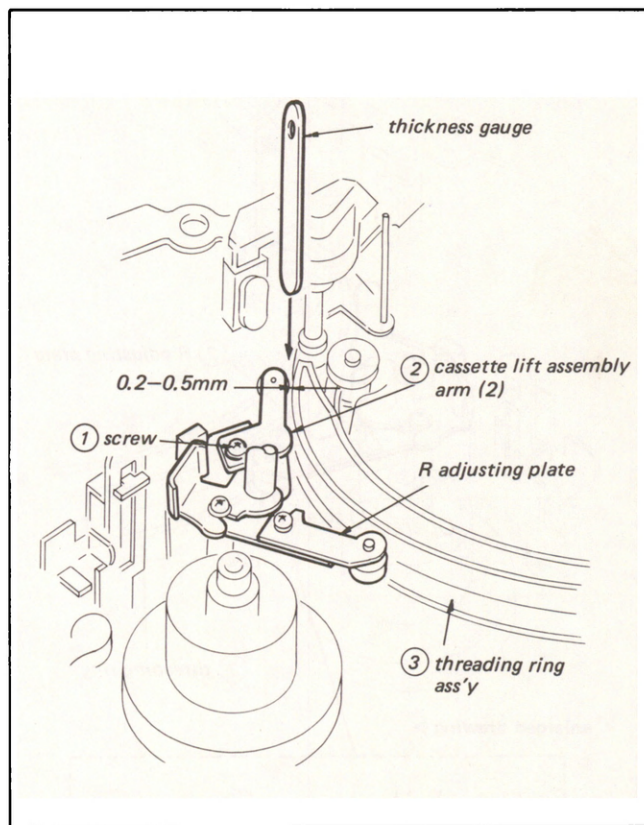


Fig. 3-21. Clearance adjustment of cassette lift assembly arm

3-8-6. Clearance Adjustment of Ring Arm

- The ring arm serves to stabilize the position of the threading ring at the completion of threading. If this adjustment is wrong, there is a possibility that the threading ring may move, from the position reached at the threading completion point, during the PLAY, FAST FWD and RECORD modes.
1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
 2. Set up the PLAY mode.
 3. Loosen screw ① shown in Fig. 3-22 and adjust R adjusting plate assembly ② so that the clearance between the roller of R adjusting plate assembly ② and threading ring assembly ③ satisfies the specification (0 to 0.2 mm). Repeat the threading and unthreading operations several times, confirm that the roller of R adjusting plate assembly ② drops into the bottom of the cam of the threading ring, and tighten screw ① after the confirmation.

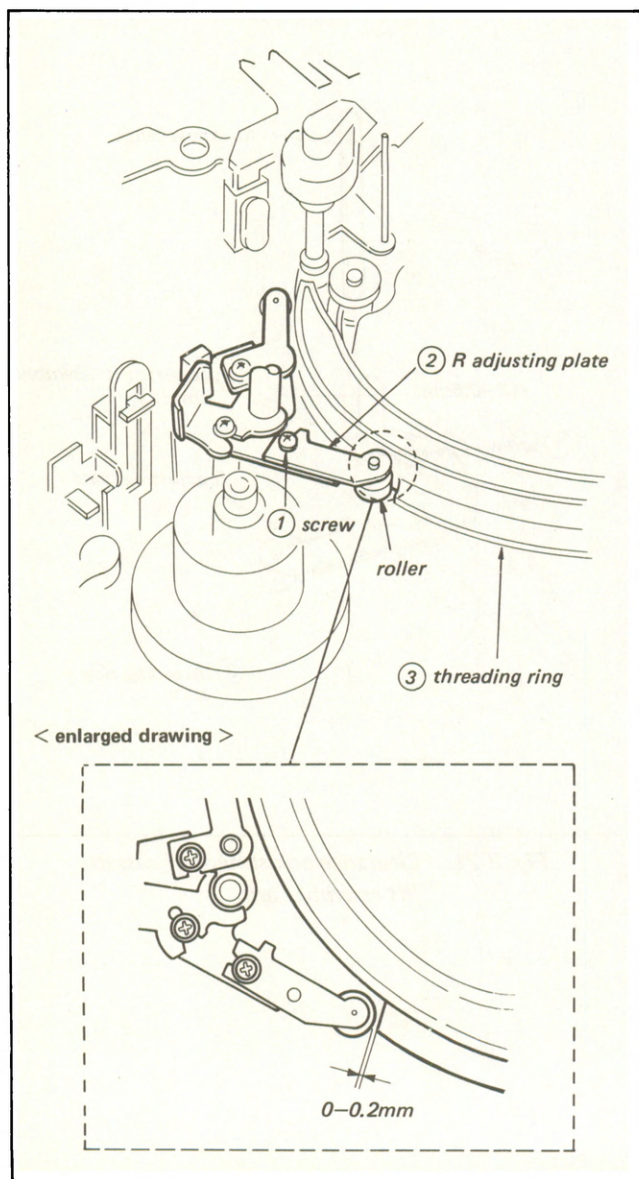


Fig. 3-22. Clearance adjustment of ring arm

3-8-7. Check of Unthreading Completion

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Set up the EJECT mode to complete the unthreading.
3. Confirm that the roller of cassette lift assembly arm (2) shown in Fig. 3-23 moves in the arrow direction when the cassette lift assembly arm (2) is pushed in the arrow direction.
4. Confirm that the tension regulator arm assembly is in contact with the boss of the cassette position-determining post. (See Fig. 3-23.)

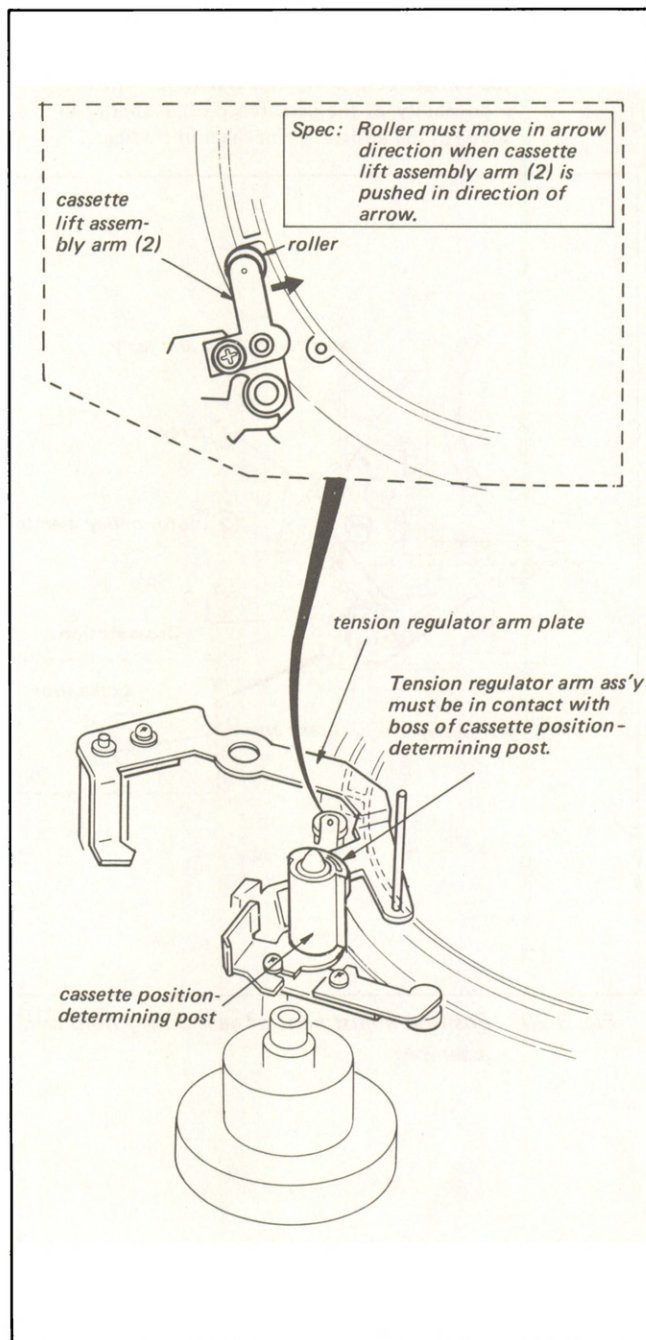


Fig. 3-23. Check of unthreading completion

3-9. POSITION ADJUSTMENT OF LID OPENER

- The mounting position of the cassette lid opener bracket is different when the cassette lift assembly is attached and is not attached to the SL-5400.

1. When the cassette lift assembly is attached;
 - (i) The plate of the cassette lid opener bracket must be near the center of the slot in the white plastic holder guide when the cassette lift assembly is lowered. If it is not in this position, bend the lower section of the cassette lid opener bracket, as shown in Fig. 3-24. for adjustment.
 - (ii) Confirm that section (A) in Fig. 3-24 satisfies the specification (0.5mm to 3mm) when the cassette is inserted and the PLAY mode is set up. This is the spacing between the tape and the take-up sensor.

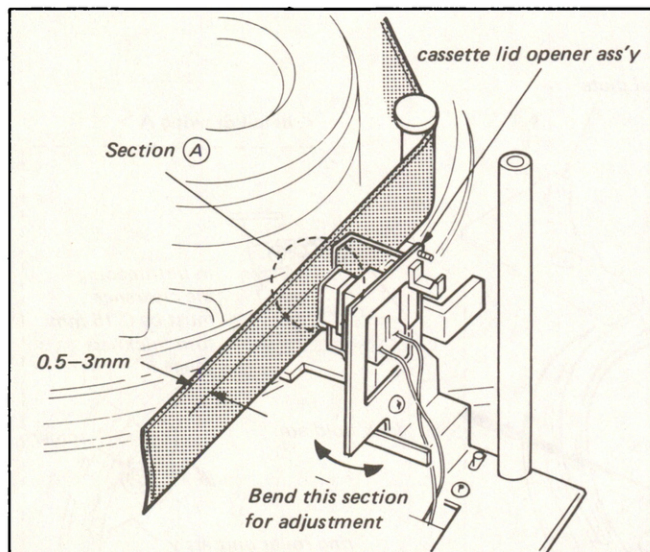


Fig. 3-24. Position adjustment of cassette lid opener metal (1)

2. When the cassette lift assembly is not attached;
 - (i) Bend the lower section of the cassette lid opener bracket so that the cassette lid opener bracket positions itself almost at the center of the space marked by asterisk(*) shown in Fig. 3-25, when the cassette is placed on the four position determining posts.

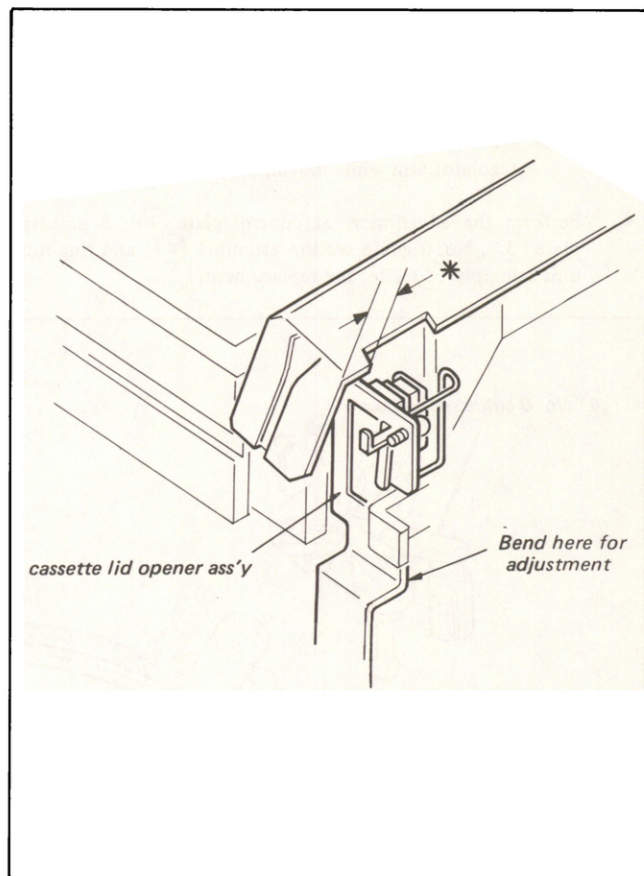


Fig. 3-25. Position adjustment of cassette lid opener metal (2)

3-10. REPLACEMENT AND ADJUSTMENT OF THREADING RING ASSEMBLY

1. Turn the threading ring to a point immediately before the threading completion position and stop it at the point where it does not touch the lock hold arm. (See Fig. 3-26.)
2. Perform procedures ① to ⑤ shown in Fig. 3-26.
3. Remove the threading ring while moving the tension regulator arm assembly in the arrow direction by holding its lower section.

Note: Do not hold the upper section of the tension regulator arm while moving the assembly.

4. Perform the adjustment of control plate ①, R adjusting plate ③, No. 0 guide section assembly ④, and ring roller unit assembly ⑤ after the replacement.

- (i) As to the adjustment of control plate ①, refer to "Position Adjustment of Threading Unit B assembly and Control Plate", Section 3-8-2.
- (ii) As to the adjustment of R adjusting plate ③, refer to "Clearance Adjustment of Ring Arm", Section 3-8-6.
- (iii) As to the adjustment of No. 0 guide section assembly ④, perform procedure 6 of this section.
- (iv) As to the adjustment of ring roller unit assembly ⑤, perform the adjustment, referring to detail drawing A in Fig. 3-26.

5. Perform the threading and unthreading several times and confirm the smooth movement of the threading ring.

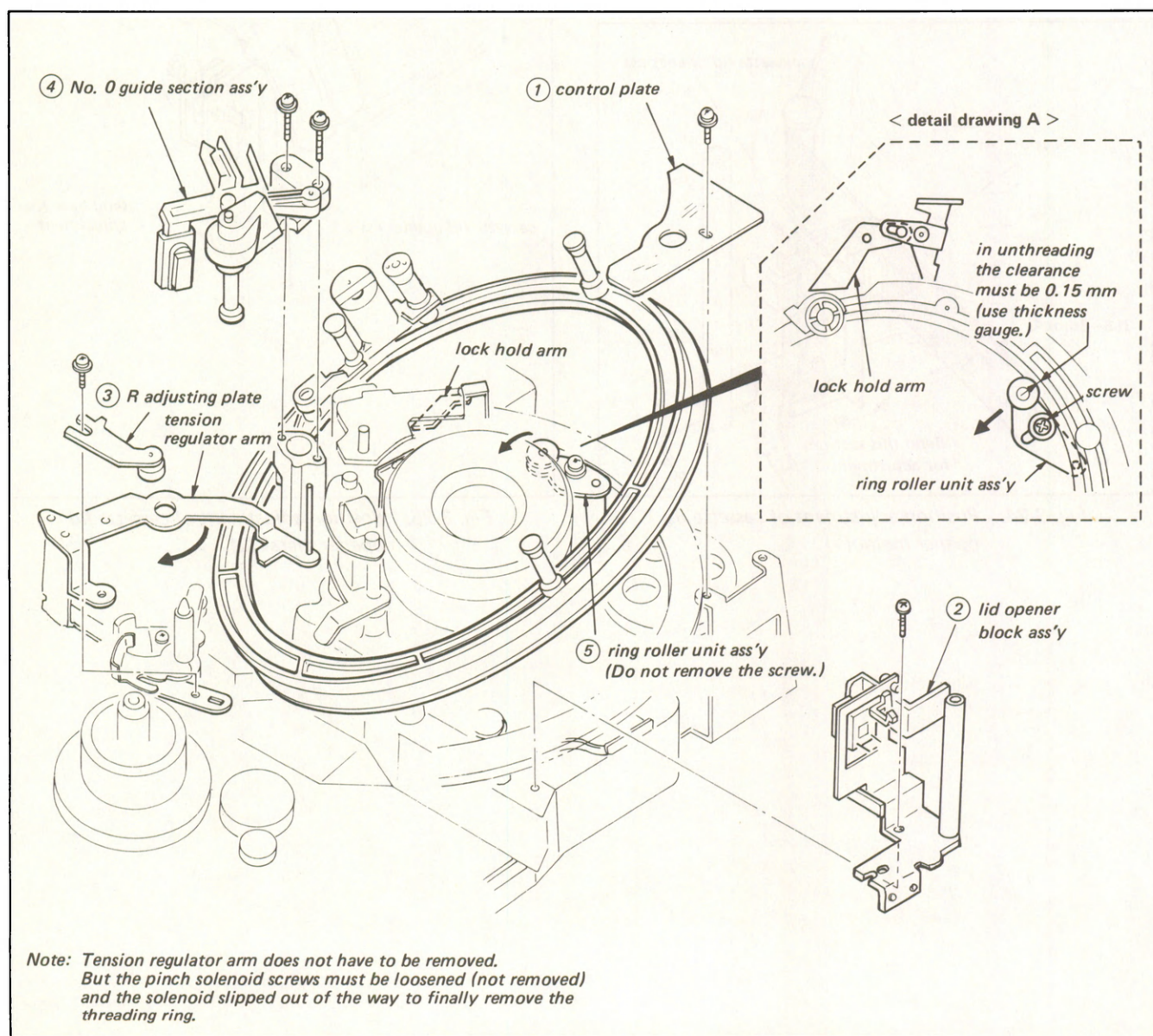


Fig. 3-26. Replacement of threading ring block assembly

6. Adjustment after the mounting of No.0 guide section assembly
 - (i) Playback the 1MHz segment of the alignment tape (KR5-1S).
 - (ii) Turn the TRACKING control knob so that the RF waveform at TP5004 on RP-1 board is 2/3 of its maximum level. (See Fig. 3-27.)
 - (iii) Turn the No.0 guide shown in Fig. 3-27 fully counter-clockwise (↺), then clockwise until the point where the RF waveform at the exit section becomes flat with small fluctuation, and tighten the mounting screws.

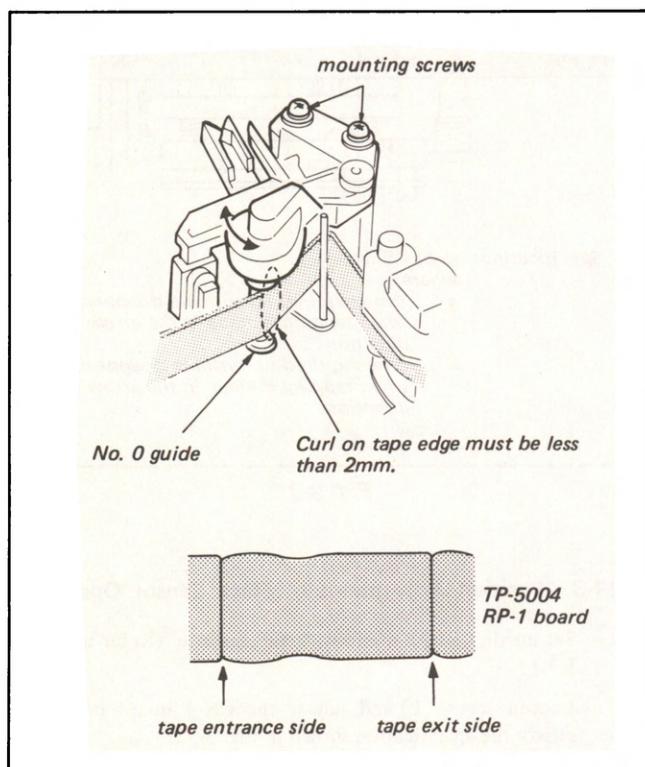


Fig. 3-27. Position adjustment of No.0 guide section assembly mounting

3-11. POSITION ADJUSTMENT OF PINCH ROLLER SOLENOID

3-11-1. Parallelism Adjustment of Pinch Press Lever

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Perform Steps ① to ③ shown in Fig. 3-28 so as to set up the state in which the screw of pinch press lever shaft adjusting plate ④ can be loosened.
3. Loosen the two screws ① fastening the pinch solenoid base ③ shown in Fig. 3-29 and tighten screws ① when the pinch solenoid base ③ becomes parallel to the drum base.

4. Loosen two screws ② shown in Fig. 3-29 by 1/3 to 1/2 turn and move pinch press lever shaft adjusting plate ④ in the direction shown by arrow B.
5. Insert a standard blade-tip screwdriver into hole F when the iron core is pulled slightly and pinch roller arm assembly ⑤ touches capstan shaft ⑥ equally along the complete length of the pinch roller. The pinch roller and the capstan should be parallel. Move the pinch press lever shaft adjusting plate ④ in the direction shown by arrow C and tighten the two screws ② when clearance A becomes 0.

Note: If the pinch roller arm assembly ⑤ does not touch the capstan with parallel and equally force when the iron core is pulled slightly, move pinch solenoid base ③ with a standard blade-tip screwdriver in the direction shown by arrow D.

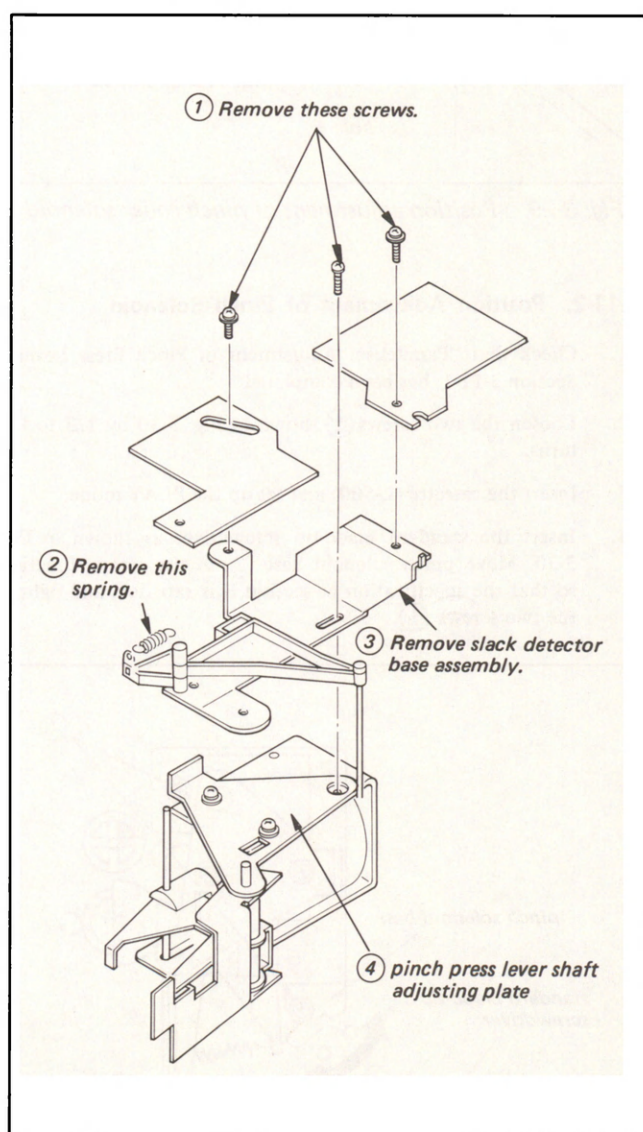


Fig. 3-28. Disassembly

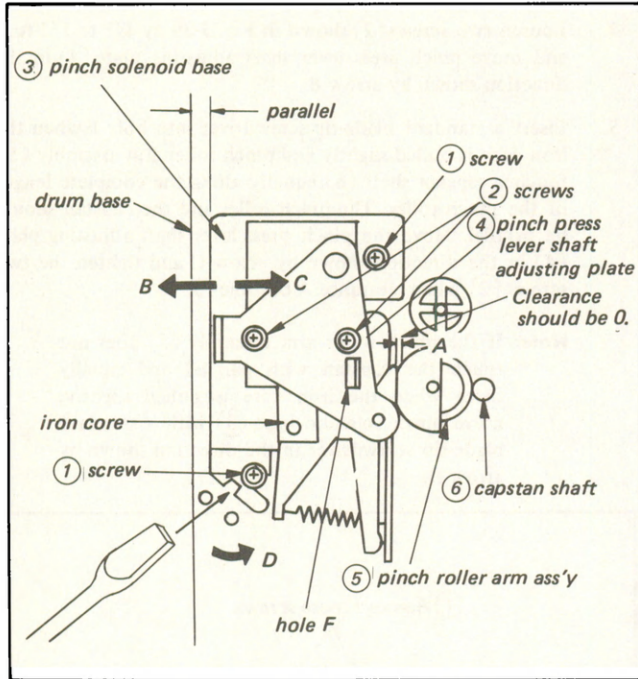


Fig. 3-29. Position adjustment of pinch roller solenoid

3-11-2. Position Adjustment of Pinch Solenoid

1. Check that "Parallelism Adjustment of Pinch Press Lever", Section 3-11-1, has been completed.
2. Loosen the two screws (1) shown in Fig. 3-30 by 1/3 to 1/2 turns.
3. Insert the cassette (L-500) and set up the PLAY mode.
4. Insert the standard blade-tip screwdriver as shown in Fig. 3-30. Move pinch solenoid base (2) in the arrow direction so that the specification at section B is satisfied, and tighten the two screws (1).

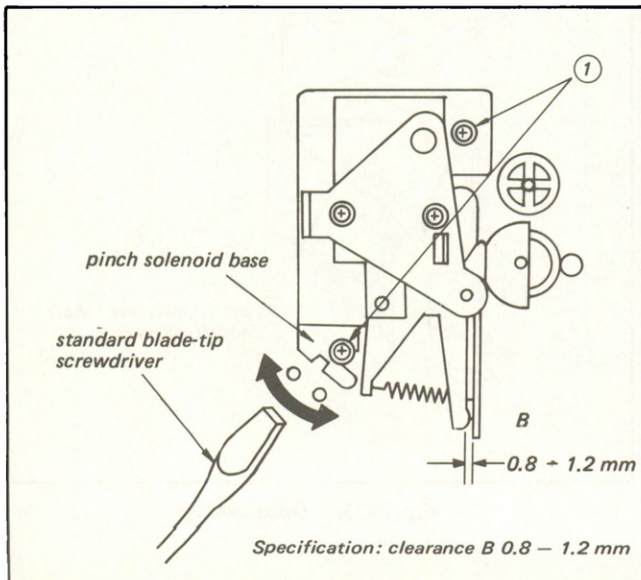


Fig. 3-30. Position adjustment of pinch solenoid

5. Tap the top and bottom of the tape around the capstan entrance and confirm that the specification shown in Fig. 3-31 is satisfied. If not, repeat Step 5 of Section 3-11-1, "Parallelism Adjustment of Pinch Press Lever".
6. Reverse Steps (1) to (3) shown in Fig. 3-28.

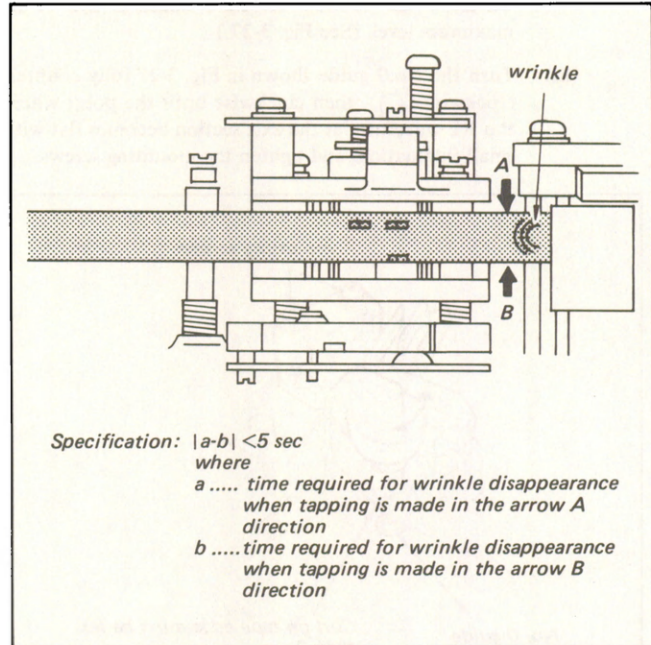


Fig. 3-31.

3-11-3. Position Adjustment of Slack Sensor Operation

1. Set up the STOP mode with the cassette. (Refer to Section 1-3.)
2. Loosen screw (1) and adjust the CN-4 board position to satisfy the specification shown in Fig. 3-32.

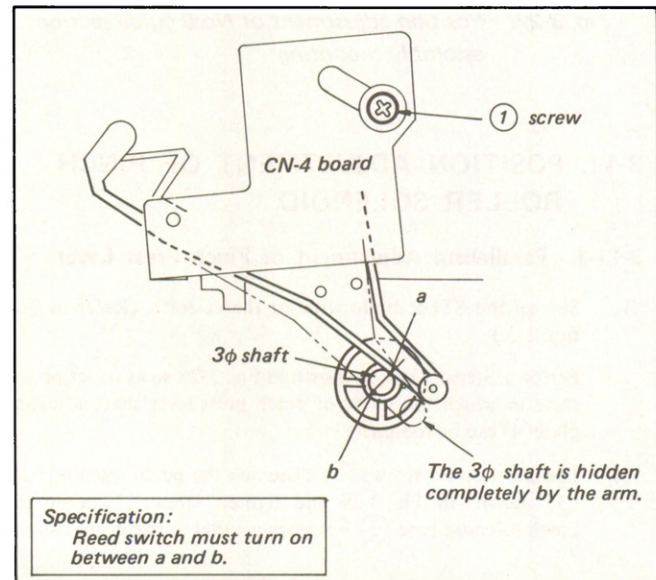


Fig. 3-32. Position adjustment of slack sensor operation

3-12. STOP SOLENOID CHECK ADJUSTMENT, AND REPLACEMENT

3-12-1. Stop Solenoid Check and Adjustment

1. Set up the STOP mode without an inserted cassette. (Refer to Section 1-3.)
2. Depress the FF button.
3. Approach a tip of a standard blade screwdriver to a point 1 mm to 3 mm away from the supply side end sensor while pushing the FF button. (See Fig. 3-33.)
4. Keep pressing the button even if the stop solenoid is energized (it is all right to remove the screwdriver from the area) and check that clearance t shown in Fig. 3-34 is 0.5 mm to 1.5 mm.
5. Confirm that the button is released when the stop solenoid is energized in all the modes.

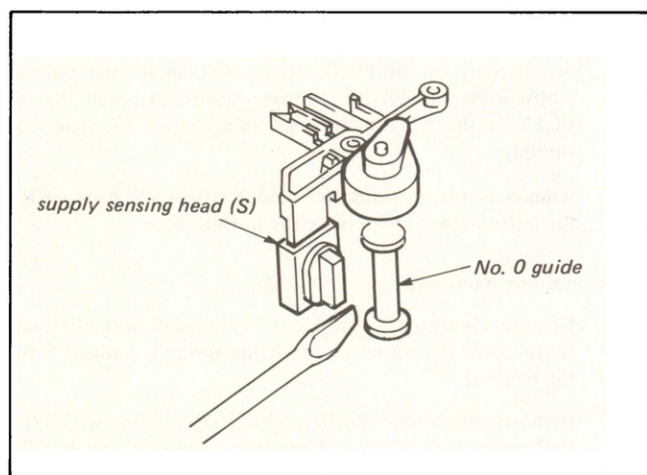


Fig. 3-33.

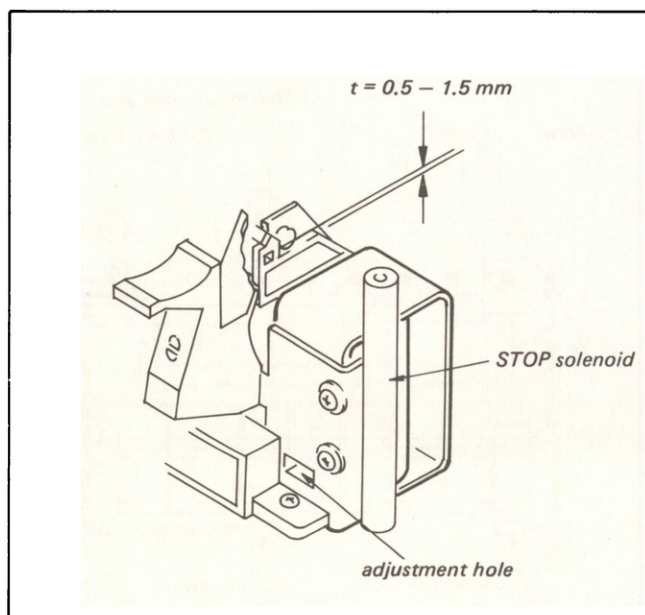


Fig. 3-34.

Adjustment Procedure when the button is not released.

6. Push the stop solenoid downward as far as it goes and secure it temporarily.
7. Perform Section 3-12-1 and energize the solenoid. Insert the standard blade-tip screwdriver into the adjustment hole and push up the solenoid gradually until clearance shown in Fig. 3-34 becomes 0.5 mm to 1.5 mm. Confirm that the stop solenoid operates securely in all the modes.

3-12-2. Stop Solenoid Replacement

1. Disconnect connector CN6401 from the SW-3 board.
2. Remove the two screws shown in Fig. 3-35 and pull the solenoid itself upward.
3. Remove the iron core from the solenoid arm.
4. Remove the iron core from a new solenoid and fix the iron core into the solenoid arm.
5. Place the solenoid itself in place while setting it to the iron core and fix it with the screws.
6. Connect connector CN6401 to the SW-3 board.
7. Perform the adjustment described in Section 3-12-1.

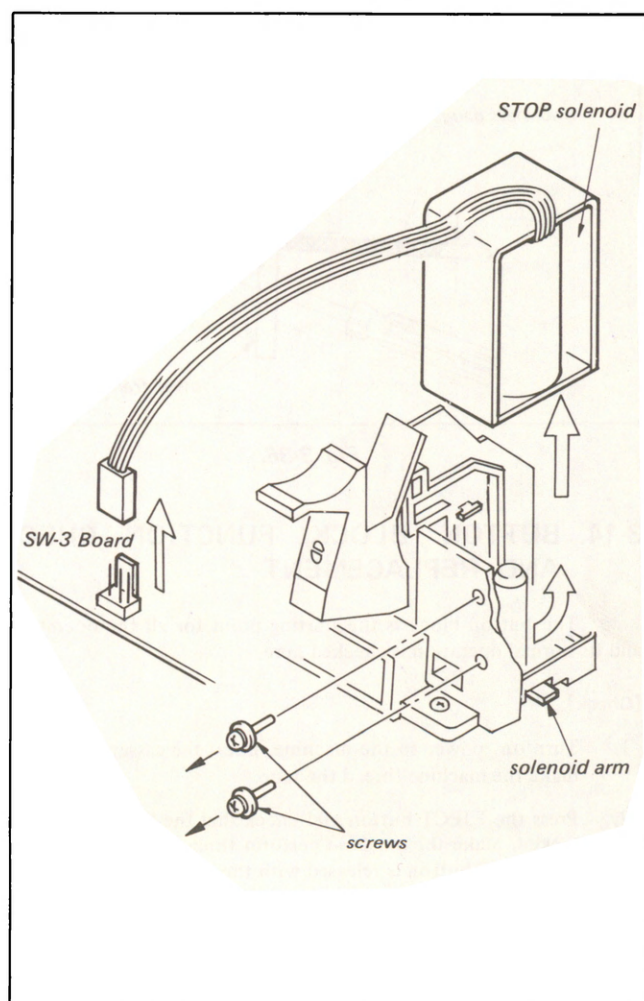


Fig. 3-35.

3-13. BUTTON SWITCH ON TIMING CHECK AND ADJUSTMENT (IN EJECT, PLAY, FF, AND REW MODES)

- The adjustment of the time that each of the EJECT, PLAY and REW buttons pushes the lever switches on the SW-3 board is necessary to combine the two operations at the optimum timing. The two operations are the mechanical operation caused by the button and the electric operations of the solenoid and the motor after the switch-on.

$$\text{EJECT \& PLAY} \quad t = 3 \begin{smallmatrix} +0 \\ -1.5 \end{smallmatrix} \text{ mm}$$

$$\text{FF \& REW} \quad t = 5 \begin{smallmatrix} +2.0 \\ -0 \end{smallmatrix} \text{ mm}$$

- The switches must turn on within the above t values. If not, insert a small Phillips-tip screwdriver into the adjustment hole and turn the screw as shown in Fig. 3-36 for the adjustment.
- Set the 3 mm or 5 mm thickness gauge as shown in Fig. 3-36. Tighten the screw, confirm that the switch turns on (by a click or by the operation start when power has been turned on in the STOP mode), tighten the screw further 90 degrees, and check that the switch does not turn off when the screwdriver is removed from the screw. If it turns off, tighten the screw further another 90 degrees.

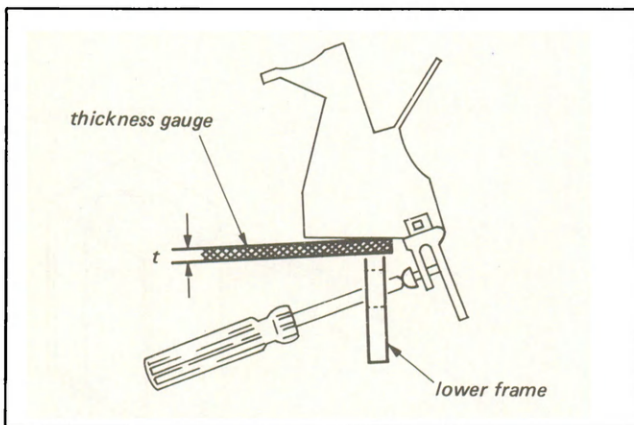


Fig. 3-36.

3-14. BUTTON BLOCK FUNCTION CHECK AND REPLACEMENT

The button block is the starting point for all the operations and its normal operation is checked here.

[Check]

- Turn on power to the machine, insert the cassette tape, and make the machine thread the tape.
- Press the EJECT button and check that the EJECT button is locked. Make the machine perform threading and check that the EJECT button is released with the cassette-up.
- Make the machine perform threading and press the REW button. Check that the REW button is locked, the REW mode is set up, and the tape is rewound.
- Press the PLAY button and check that the PLAY button is locked, the PLAY mode is set up, and the tape is running.

- Press the FF button and check that the FF button is locked, the FF mode is set up, and the tape is running fast.
- Press the REC button and check that the REC button is locked and the REC mode is set up. Press the REC button together with the PLAY button and check that the REC and the PLAY buttons are locked.
- Check that the DUB button cannot be pressed alone. Press the PLAY button and the DUB button after the PLAY mode is set up. Check that the PLAY button is not released, the DUB button is locked, and the DUB mode is set up.
- Press the FF or the REW button in the PLAY mode. Check that the PLAY button is not released, the CUE or the REVIEW mode is set up, and the set-up mode is changed to the original PLAY mode when the pressed FF or the REW button is released from the finger. Also check that the FF or the REW button is not locked in this case.
- Press the STOP button and check that all other buttons are released from lock.
- Press the PAUSE button and check that the PAUSE mode is set up only in the PLAY or the REC mode and the tape stops. Press the PAUSE buttons again and check that the PLAY or the REC mode is set up again and the tape starts running.
- When a wrong operation is found, confirm that its cause is in the button block and replace the button block.

[Button Block Removal]

- Remove the spring (① in Fig. 3-37) hooked on the FF plate. Write down the tooth on which the spring is hooked before the removal.
- Remove connectors CN6401, 6402 (② & ③ in Fig. 3-37) of the pause microswitch and the stop solenoid from the SW-3 board.
- Remove the three screws (④, ⑤, & ⑥ in Fig. 3-37) mounting the button block and pull the button block upward. Do not catch the counter belt with the button block during the removal.

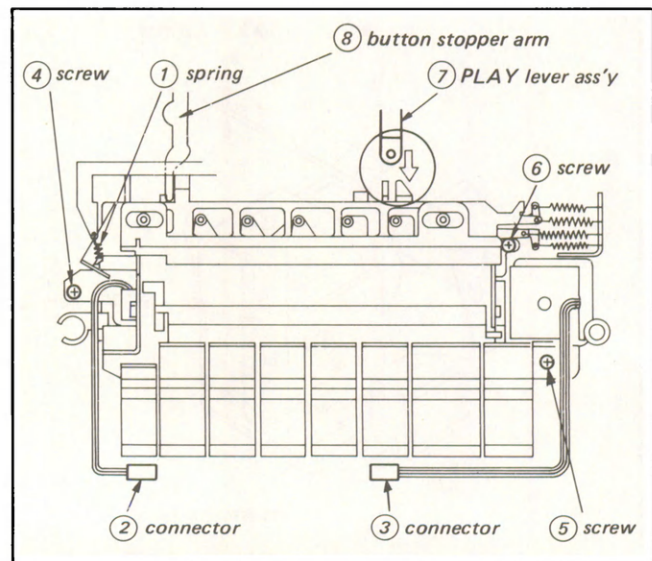


Fig. 3-37.

[Button Block Mounting]

1. Complete the threading and turn off power.
2. Confirm that the three levers (① in Fig. 3-38) of the plunger unit are slanting fully toward the upper right, viewed from the top.
3. Confirm that the button stopper arm 8 is fully rightwards. (See Fig. 3-37.)
4. Bring down the button block from the topside so that the tips of the four levers (② in Fig. 3-38) on the SW-3 board fit the respective holes on the back side of the button block, position the button block so that the tooth of the slide plate No. 4 gears into the pin (⑦ in Fig. 3-37) on the drive block assembly. Check that there is not any play in the up and down directions and fasten the button block.

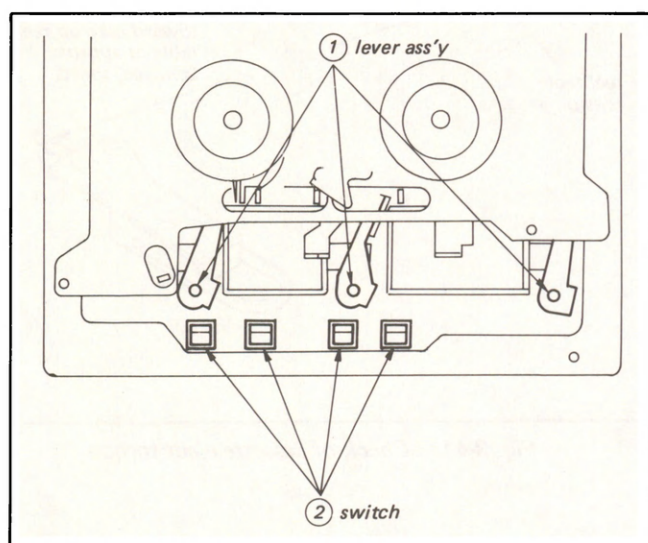


Fig. 3-38.

3-15. POSITION ADJUSTMENT OF THREADING END SWITCH

- Prior to this adjustment, the following adjustments must be completed.
 - 3-8-5. Clearance adjustment of cassette lift assembly arm
 - 3-8-6. Clearance adjustment of ring arm
 - 3-8-7. Check of unthreading completion
- 1. Turn the threading ring by hand and stop it at the point immediately before the threading completion position.
- 2. Loosen screw (4) and adjust the position of microswitch (3) so that microswitch (3) turns on before gear pulley hold arm (1) moves from the groove of lock arm (2), while turning the threading ring counterclockwise (↺) slowly by hand. Confirm the turning-on of the microswitch with a click.
- 3. Adjust the position further so that the clearance between the actuator of microswitch (3) shown in Fig. 3-39 and the microswitch satisfies the specification (within 0.5mm) when the threading ring is turned counterclockwise (↺) beyond the threading completion point.
- 4. Repeat Steps 2 and 3 for confirmation.

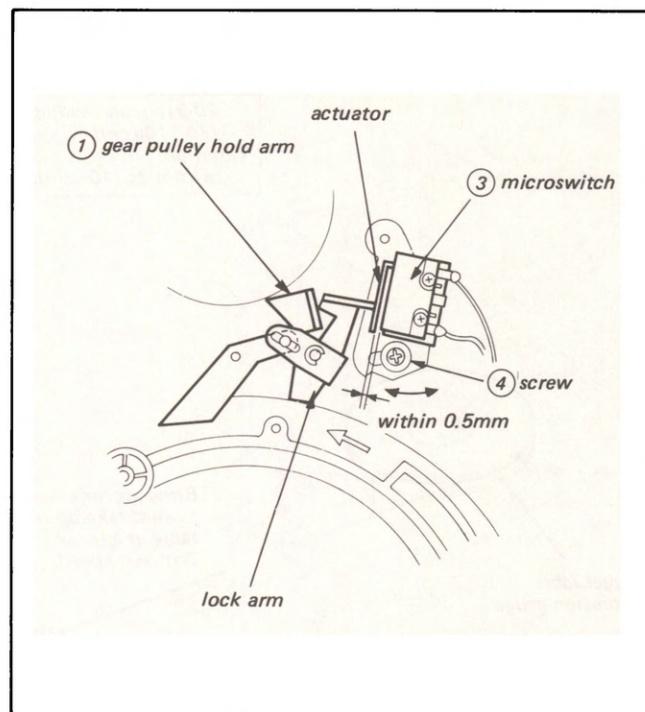


Fig. 3-39. Position adjustment of threading end switch

3-16. CHECK OF TAKE-UP TORQUE

- Since sufficient take-up torque cannot be obtained at the last section of the tape if the take-up torque is below the specified value, tape slackness is caused at the capstan shaft point and sometimes the slack sensor operates.
 - The take-up torque tends to increase gradually due to aging.
1. Rewind the tape a little and set up the PLAY mode (for the playback of the very last section of the tape) after the auto-stop at the tape end in the FAST FWD mode. Confirm that the tape runs without any slackness at the capstan shaft area. If the tape slackens, perform the following adjustments.
 2. Clean the take-up reel table assembly, the FWD idler assembly, and the FWD belt with a piece of cloth dampened with isopropyl alcohol.
 3. Stop the operation of the slack sensor. (Refer to section 1-4.)
 4. Attach the reel table tension gauge (Tool Kit Ref. No. J-4) on the take-up reel table as shown in Fig. 3-40.
 5. Pull out the string from the reel table tension gauge about 30 cm (12 inches) and hook the sector type tension gauge (50g full scale, Tool Kit Ref. No. J-6) on the end of string.
 6. Set up the PLAY mode.
 7. Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. (8 inch/sec.) as shown in Fig. 3-40. Confirm that the gauge reading is within the specification. If not, replace the FWD limiter assembly and make the check again.

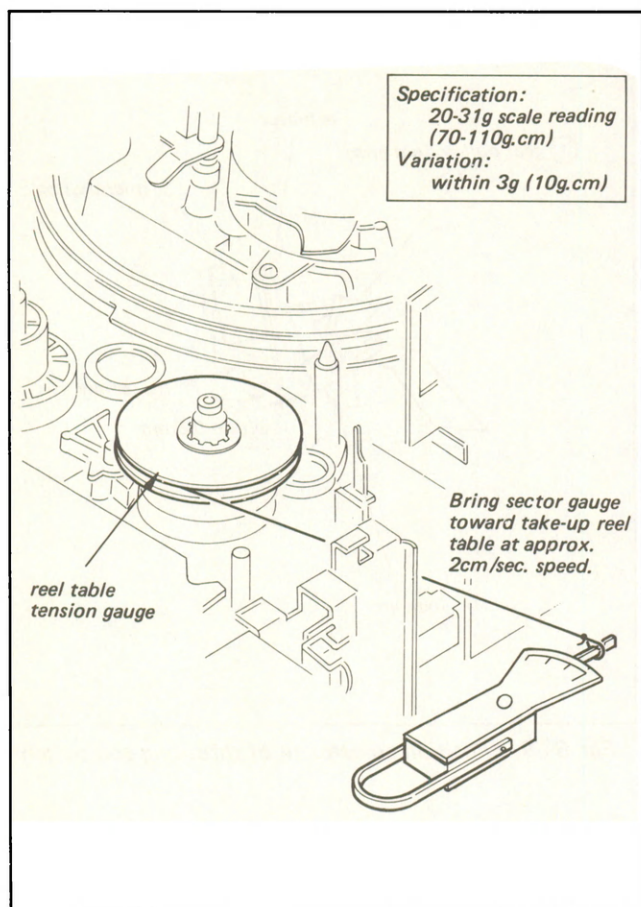


Fig. 3-40. Check of take-up torque

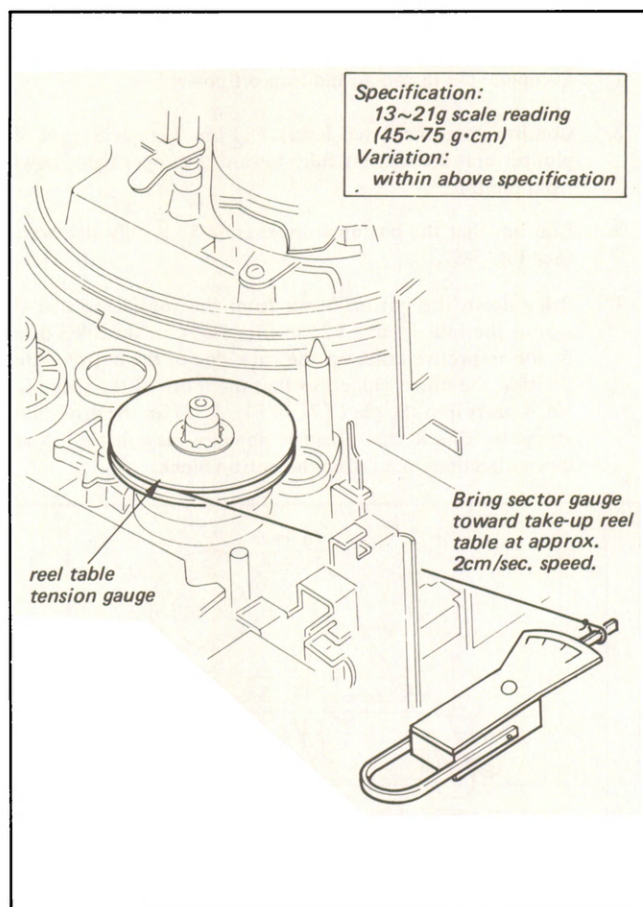


Fig. 3-41. Check of cassette eject torque

3-17. CHECK OF CASSETTE EJECT TORQUE

- The tape is taken up by the take-up reel table in the cassette EJECT mode. The take-up reel table is driven via the belt by the DC motor, while the threading ring unthreads.
 - If the cassette eject torque is below the specification, only the threading ring performs the unthreading operation while the tape is not pulled back into the cassette, and the tape can be damaged.
- Clean the take-up reel table, the E idler assembly, and the EJECT belt with a piece of cloth dampened with isopropyl alcohol.
 - Attach the reel table tension gauge (Tool Kit Ref. No. J-4) as shown in Fig. 3-41.)
 - Pull out the string of the gauge about 30 cm (12 inches) and hook the sector type gauge (50g full scale, Tool Kit Ref. No. J-6) on the end of the string.
 - Set up the EJECT mode.
 - Bring the sector type gauge toward the take-up reel table at a speed of approx. 2cm/sec. during the unthreading as shown in Fig. 3-41. Confirm that the gauge reading is within the specification. If not, replace the E limiter assembly (X-3659-301-0) of the threading unit section and make the confirmation again.

3-18. CHECK OF BRAKE TORQUE

- This machine has the supply brake, take-up brake, soft brake, and pause brake to stop the taking-up of the tape in the PAUSE mode. These brakes operate as follows.

Reel table ass'y Mode	Supply side	Take-up side
Cassette EJECT mode	Supply and soft brakes are ON.	Only take-up brake is ON.
Threading mode	Only soft brake is ON. (It is normal that the supply reel rotates a little, supplying tape.) Soft brake torque; 15 to 30 g.cm. Reel table rotational direction is CW (↻).	Free (Tape is supplied from take-up side.)
STOP mode	Supply and soft brakes are ON. Reel table rotational direction CW (↻): 100 to 500g.cm Reel table rotational direction CCW (↺): 40 to 130g.cm	Only main brake is ON. Reel table rotational direction CW (↻): 20 to 60g.cm Reel table rotational direction CCW (↺): 60 to 500g.cm

FF mode	Only soft brake is ON.	Free (Tape is taken up to take-up side.)
REW mode	Free	Free
PLAY mode	Only FWD back tension brake band is ON.	Free (Tape is taken up to take-up side.)
REC PAUSE mode & PLAY PAUSE mode	FWD back tension brake is ON.	Take-up and pause brakes are ON.
Unthreading mode	Only soft brake is ON. (It is normal that supply reel rotates a little, supplying tape.)	Free (Tape is taken up to take-up side.)

3-18-1. Check of Supply and Take-up Brake Operations

- When the tape slackens in when the mode is changed to STOP from PLAY and to STOP from REWIND, perform the check and adjustment, following the steps below.
 - Since the slackness tends to occur when a wound diameter of the tape on a reel table is small, the check must be made in such a state.
1. Insert the cassette and set up the initial state of taking-up of the tape. (Rewind the tape and cue its beginning.)
 2. Repeat the operation, changing the mode from PLAY to STOP two or three times and confirm that there is no tape slackness. If the tape slackens, perform steps 5 and 6 for adjustment.
 3. Set-up the condition where the tape is about to be completely wound on the take-up reel. (Fast forward the tape and stop the tape movement at its end section.)
 4. Repeat the operation, changing the mode from REWIND to STOP two or three times and confirm that no tape slackness occurs. If the tape slackens, perform Steps 5 and 6 for adjustment.
 5. Remove the reel table assembly and clean the surface of the reel table assembly and the brake shoe with a piece of cloth dampened with isopropyl alcohol.

3-18-2. Check of Supply and Take-up Brake Torque

1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
2. Attach the reel table tension gauge (Tool Kit Ref. No. J-4) to the take-up reel table as shown in Fig. 3-42 and hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-7) to the end of the string. Pull the sector type gauge at a speed of approx. 2 cm/sec. and read the gauge value.

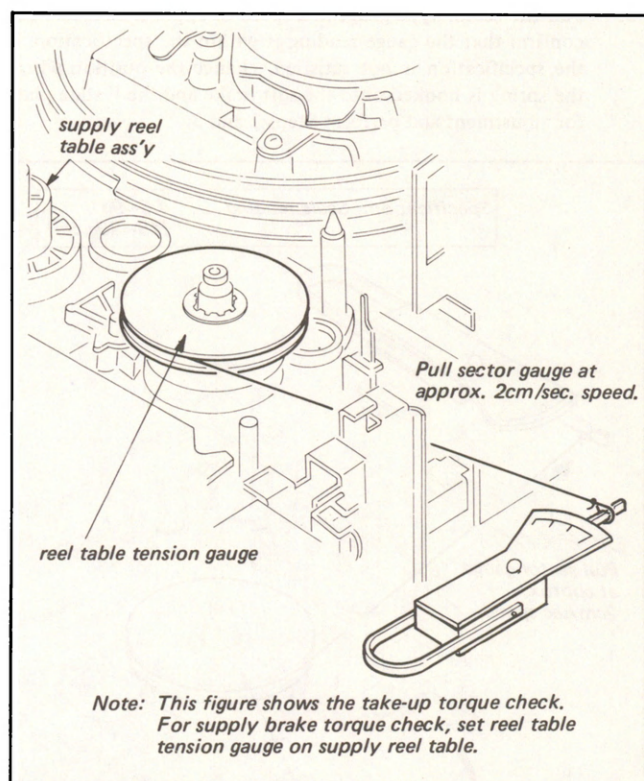


Fig. 3-42. Check of supply and take-up brake torque

Specification

- When supply reel table ass'y rotates CW (↻):
100 to 500g.cm (Scale value is 29 to 143g.)
- When supply reel table ass'y rotates CCW (↺):
40 to 130g.cm (Scale value is 11 to 37g.)
- When take-up reel table ass'y rotates CW (↻):
20 to 60g.cm (Scale value is 6 to 17g.)
- When take-up reel table ass'y rotates CCW (↺):
60 to 500g.cm (Scale value is 17 to 143g.)

3-18-3. Check and Adjustment of Soft Brake Torque

1. Push the cassette detector lever by hand and release the lever during the threading. (In this condition, the supply and take-up brakes are released.)
2. Mount the reel table tension gauge (Tool Kit Ref. No. J-4) on the supply reel table as shown in Fig. 3-43 and hook the sector type gauge (50g full scale, Tool Kit Ref. No. J-6) to the end of the string of the tension gauge.
3. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If the specification is not satisfied, change the position where the spring is hooked onto the soft brake and the F slide plate for adjustment and perform Steps 2 and 3.

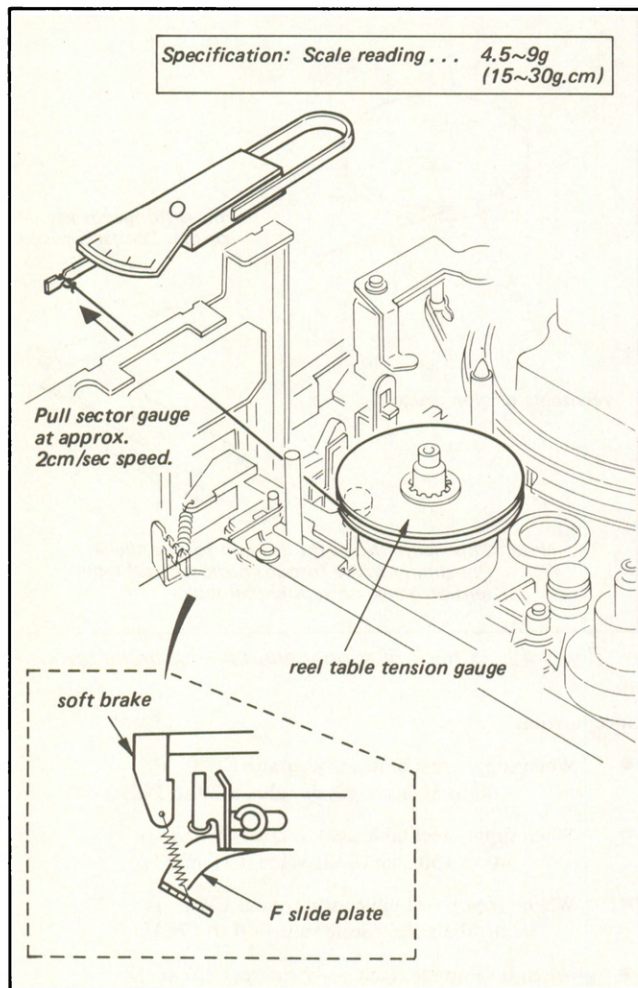


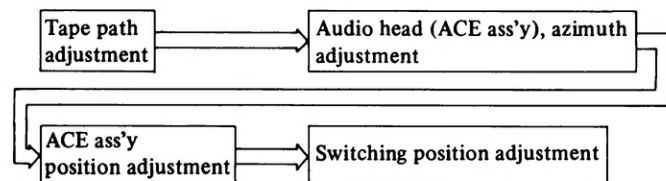
Fig. 3-43. Check of soft brake torque

3-19. ADJUSTMENT OF FWD BACK TENSION

- The ideal measurement of the FWD back tension is to measure it under the same conditions as during the actual tape running state. The simple measurement procedure of the FWD back tension is described here. The measurement error due to the different measurement procedure is corrected in the specification.
1. Set up the STOP mode without the cassette. (Refer to Section 1-3.)
 2. Place the FWD back tension jig (Tool Kit Ref. No. J-5) on the supply reel table assembly and thread the tape as shown in Fig. 3-44. Hook the sector type gauge (100g full scale, Tool Kit Ref. No. J-7) to the end of the tape.
 3. Set up the PLAY mode.
 4. Pull the sector type gauge at a speed of approx. 2cm/sec. and confirm that the gauge reading is within the specification. If not, perform Steps 5 and 6.
 5. Loosen the screw mounting the BT adjusting plate and move the BT adjusting plate in the direction shown by the arrow for the adjustment.
 6. Repeat Steps 2 to 4 again.

3-20. ADJUSTMENT OF TRACKING

- Sequence of tracking adjustment



[Preparation]

1. Fixtures and Tools Required:
 - Alignment tape (KR5-1S)
 - Dual trace oscilloscope
 - Inspection mirror (Tool Kit Ref. No. J-9)
 - Methanol or Isopropyl Alcohol (Tool Kit Ref. No. J-12)
 - Chamois (Tool Kit Ref. No. J-13)
 - 3 mm flat tip screwdriver
2. Oscilloscope connection

RF envelope waveform:	TP-5004		RP-1 board
External trigger:	TP-5003		RP-1 board
AUDIO OUT:	TP-2066		SA-3 board
VIDEO OUT:	TP-1011		YC-4 board
Switching waveform:	TP-5003		RP-1 board

1.7602

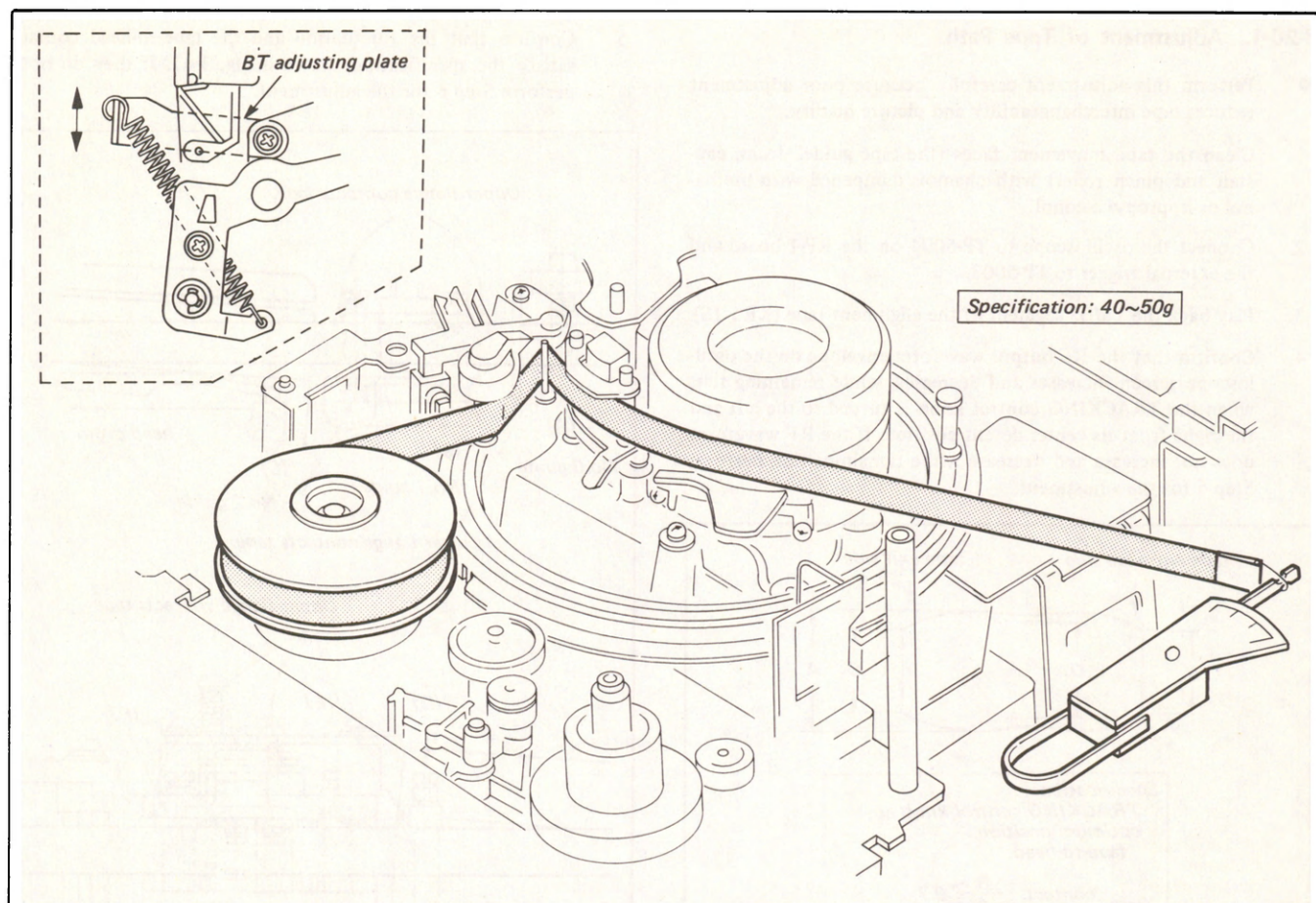


Fig. 3-44. Adjustment of FWD back tension

4. Location of circuit boards

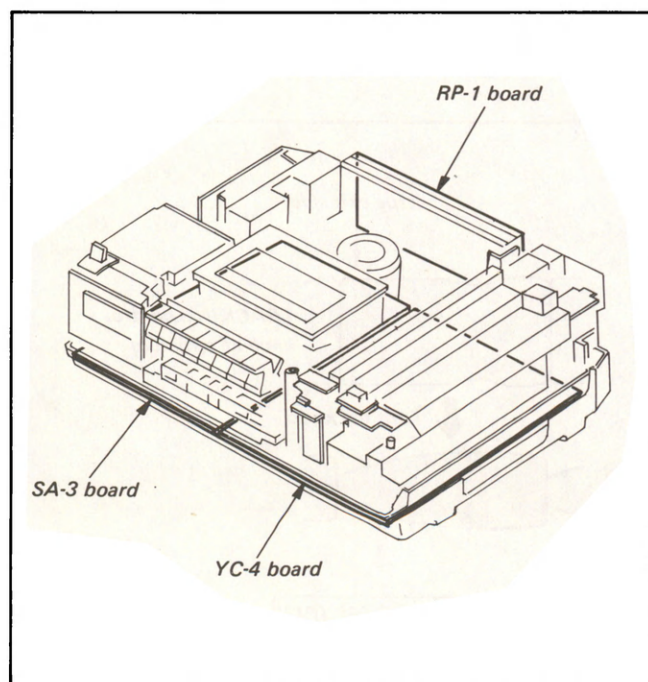


Fig. 3-45. Location of circuit boards

5. Location tape guides

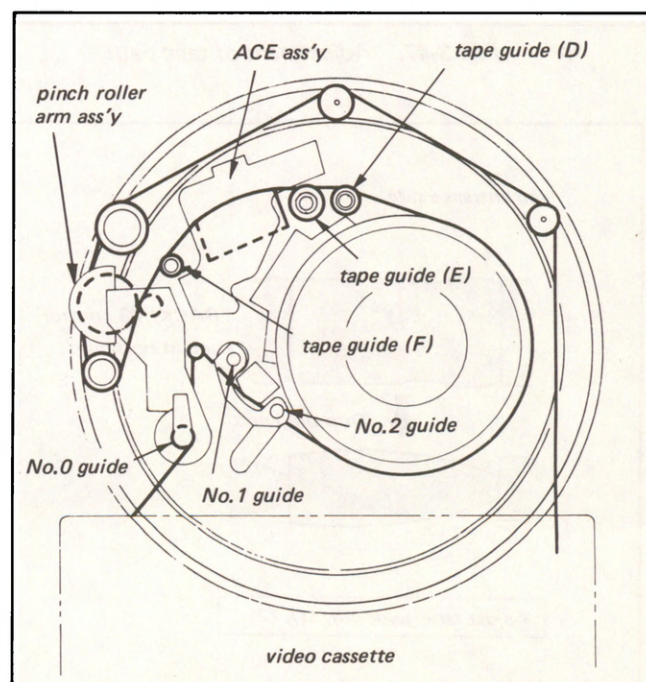


Fig. 3-46. Location of tape guides

3-20-1. Adjustment of Tape Path

- Perform this adjustment carefully because poor adjustment reduces tape interchangeability and picture quality.
1. Clean the tape movement faces (the tape guide, drum, capstan and pinch roller) with chamois dampened with methanol or isopropyl alcohol.
 2. Connect the oscilloscope to TP-5004 on the RP-1 board and the external trigger to TP-5003.
 3. Play back the 1 MHz segment of the alignment tape (KR5-1S).
 4. Confirm that the RF output waveform envelope on the oscilloscope screen increases and decreases, while remaining flat, when the TRACKING control knob is turned to the left and the right from its center detent position. If the RF waveform does not increase and decrease while remaining flat, perform Step 6 for the adjustment.

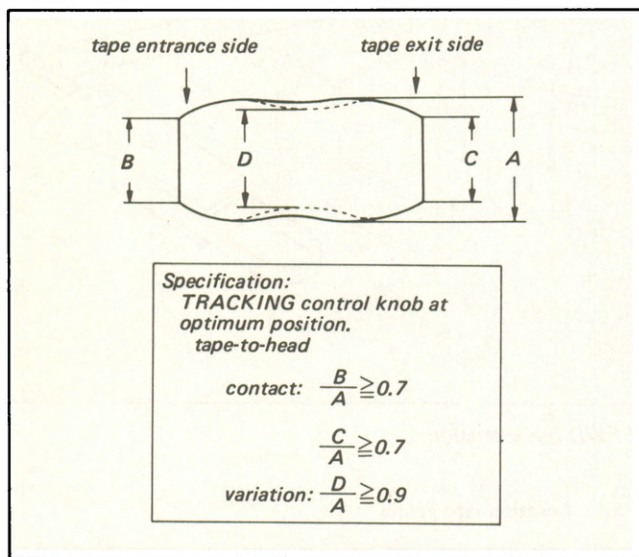


Fig. 3-47. Adjustment of tape path

5. Confirm that the fluctuation and the tape-to-head contact satisfy the specification shown in Fig. 3-47. If they do not, perform Step 6 for the adjustment.

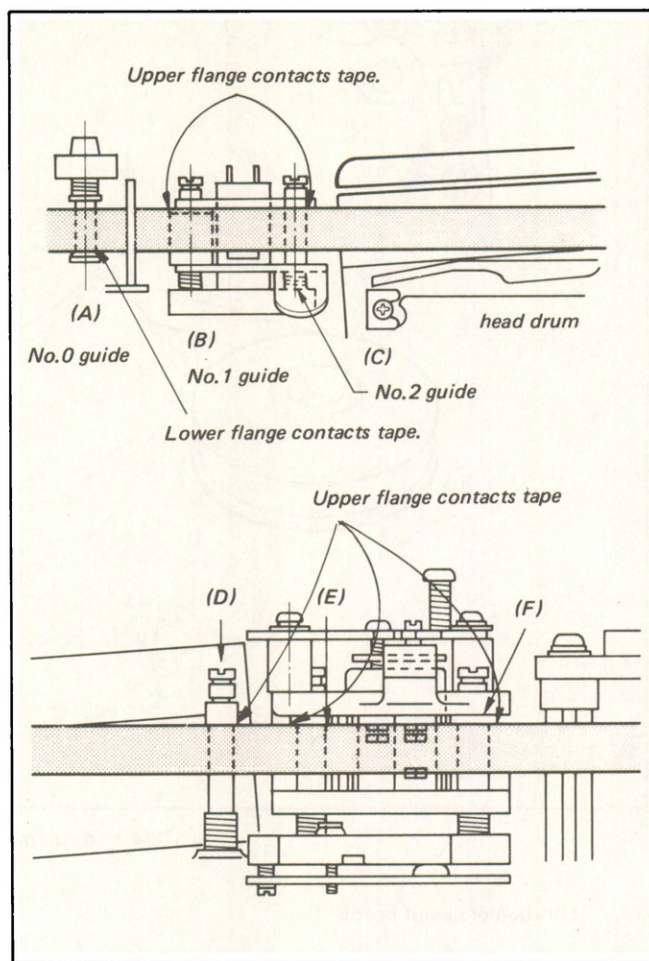


Fig. 3-49. Adjustment of tape path

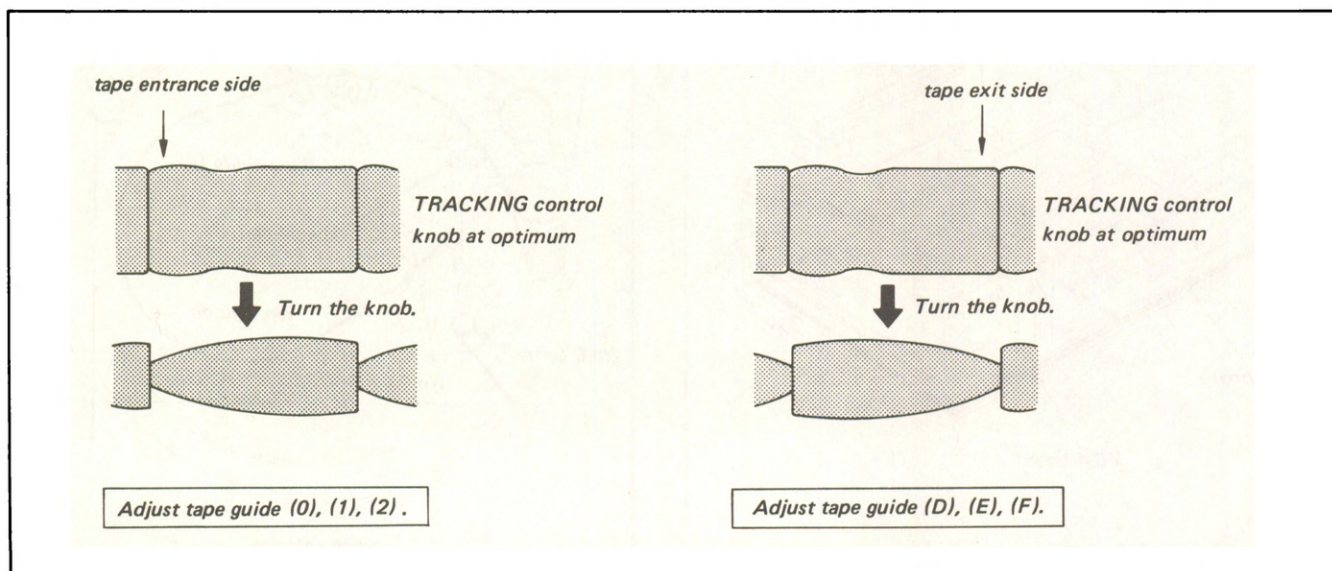


Fig. 3-48. Adjustment of tape path

6. When the waveform at the tape entrance side is not flat as shown in Fig. 3-48) for the clockwise and counterclockwise turning of the TRACKING control knob from center, detent position, adjust the heights of tape guides (0), (1), and (2). When the waveform at the tape exit side is not flat, adjust the heights of tape guides (D), (E), and (F). The height adjustment must be performed so that the tape contacts the drum heads, there is no curl at the flange of each tape guide, the upper or lower flanges contact the tape as shown in Fig. 3-49, and the RF waveform is flat.

Note: The construction of the ACE assembly enables the assembly to be adjusted so that its top plate is perpendicular to the face of the moving tape as a whole, but this "Zenith" adjustment is not necessary except after ACE assembly replacement.

Since tape guide (D) regulates the movement of the tape around the drum exit, raise tape guide (D) about 0.5 mm before the adjustment of the tape path on the exit side. Then lower tape guide (D) to the point immediately before the RF waveform varies, with no curls after the tape path adjustment.

3-20-2. Adjustment of Exit Side Tracking after ACE Assembly Replacement

1. The ACE assembly can be removed if the three screws shown in Fig. 3-50 are removed.

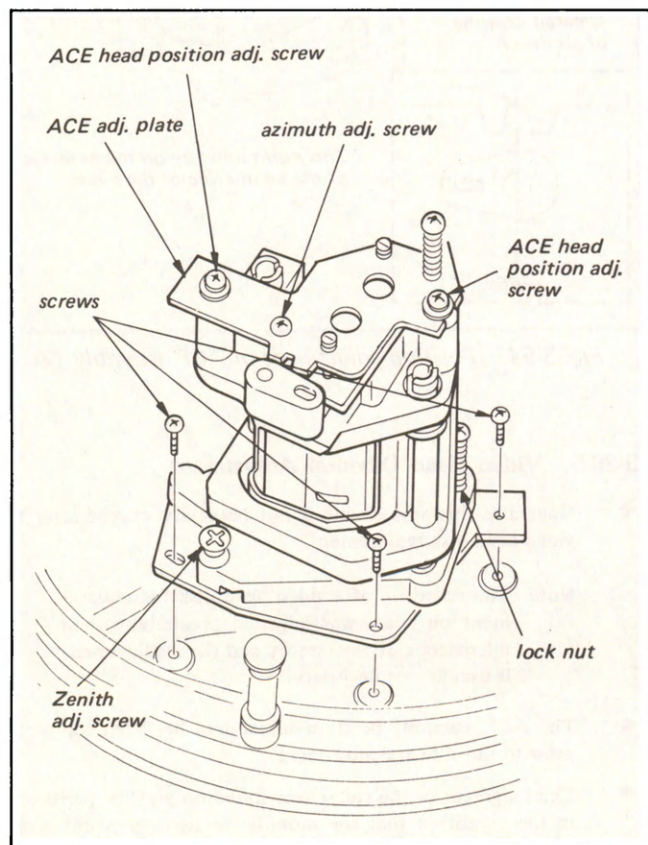


Fig. 3-50. Removal of ACE assembly

2. Perform the adjustment following Step 3 after the completion of the replacement.
3. Raise the tape guide (D) shown in Fig. 3-49 by 0.5 mm. (Turn the nut one turn.)
4. Play back the 1 MHz segment of the alignment tape (KR5-1S). Confirm that the RF wave output (see Fig. 3-47) satisfies the specification and there is no curl on the tape edge contacting the tape guide. Confirm that the RF waveform varied from the flat state when the tape guides (E) and (F) are raised and adjust the heights of the tape guides so that the waveform output becomes flat.
5. When the waveform does not vary if the tape guides (E) and (F) are raised in Step 4 or when the waveform does not become flat if the tape guides are lowered, perform the adjustment, following the procedure below.
 - (i) Loosen the lock nut shown in Fig. 3-50.
 - (ii) Turn the zenith adjusting screw 30 degrees counterclockwise (↺) and tighten it clockwise (↻).
 - (iii) Perform Step 4 again. If the specification is not satisfied, perform Step 5 again. Since the ACE assembly was adjusted perpendicularly when assembled at the factory, do not turn the zenith adjusting screw more than 60 degrees to the right and left from the original position.
 - (iv) After the adjustment, tighten the lock nut until a slight resistance for the tightening is felt and confirm that the specification in Step 4 is satisfied.
6. When there is an edge curl at the tape contacting the tape guide in Step 4, perform the adjustment, following the procedure below.
 - (i) Loosen the lock nut shown in Fig. 3-50.
 - (ii) Tighten the zenith adjusting screw only 15 degrees.
 - (iii) Perform Step 4 again. If the specification is not satisfied, perform Steps 5 and 6 again, but do not turn the zenith adjusting screw to the right and left more than 60 degrees from its original position.
 - (iv) Tighten the lock nut until a slight resistance is felt after the adjustment. Confirm that the specification in Step 4 is satisfied.

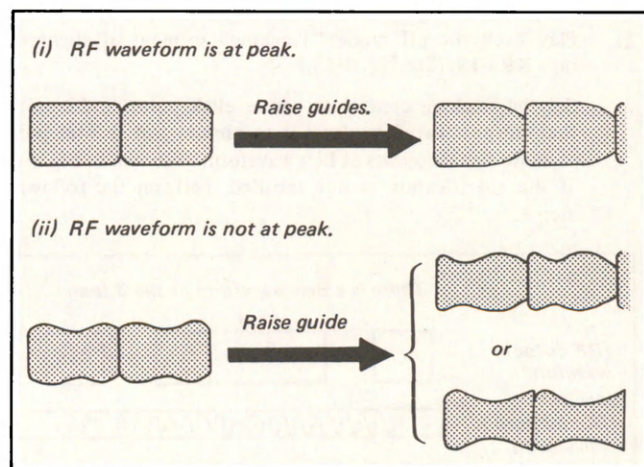


Fig. 3-51. Adjustment of exit side tracking after ACE assembly replacement

3-20-3. Audio Head Azimuth Adjustment

[Connection of Relative Equipment]

The connections of the equipments to the input/output terminals are shown in Fig. 3-52.

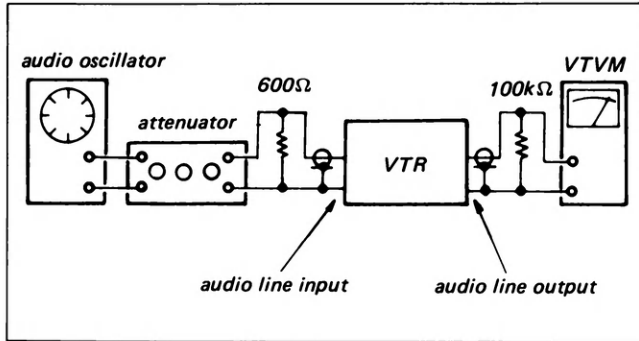


Fig. 3-52. Connections

1. Terminate the audio line output terminal with a 100 k Ω resistor and connect a VTVM.
2. Play back the 5 kHz signal segment of the alignment tape.
3. Adjust the azimuth adjustment screw on the audio head for a maximum VTVM reading. (See Fig. 3-50.)

Note: Loosen azimuth adjustment screw before the adjustment and tighten it after the completion.

3-20-4. Position Adjustment of ACE Assembly

- This adjustment includes the mechanical head mounting position adjustment and the electrical tracking control center adjustment.
- The adjustment sequence is to perform the tracking control center adjustment and then the mechanical adjustment of the head mounting position. If this sequence is reversed, poor tracking occurs.

1. Connect a dual-trace oscilloscope as follows.
CH-1 TP-5004 (RP-1 board)
CH-2 TP-2066 (AS-3 board)
Ext trigger TP-5003 (RP-1 board)
2. Play back the β II mode "Tracking" segment of alignment tape KR5-1S. (See Fig. 3-53.)
3. Set the tracking control to center click point, and confirm that output waveform level is maximum and 0 level point of audio signal appears at Bch waveform as shown in Fig. 3-53. If the specification is not satisfied, perform the following step 4.

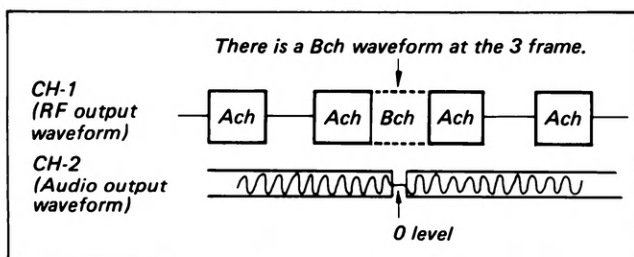


Fig. 3-53. Position adjustment of ACE assembly (1)

4. Perform the tracking control center adjustment.
[Refer to section 4-3-2(2).]
 5. Set the TRACKING control knob to its center detent point and play back the "Tracking" segment of the alignment tape (KR5-1S).
 6. Loosen the two position adjusting screws of the ACE head and adjust the cut-out section of section A for maximum RF output waveform and 0 level point of audio signal appears at Bch waveform.
- Note:** Perform the adjustment so that the center of the cut-out section of the A section will almost the center of the hole.
7. Play back the β II mode segment of the alignment tape and confirm the picture appearance.
 8. Tighten the position adjusting screw of the ACE head.

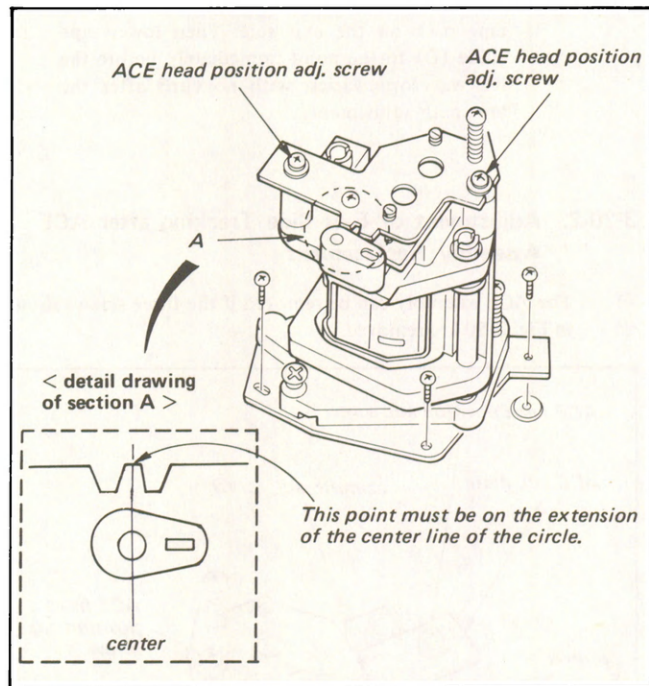


Fig. 3-54. Position adjustment of ACE assembly (2)

3-20-5. Video Head Dihedral Adjustment

- Generally this adjustment is not necessary except after the video head disk replacement.

Note: The dihedral of a video head disk for replacement purposes was adjusted precisely with a microscope at the factory and the readjustment is usually not necessary.

- The ACE assembly position adjustment has been completed prior to this dihedral adjustment.
- The judgment of the video head dihedral must be performed in the condition that the monoscope signal segment of the alignment tape (KR5-1S) is played back and the TRACKING control knob is set to the center detent position. (See Fig. 3-55.)

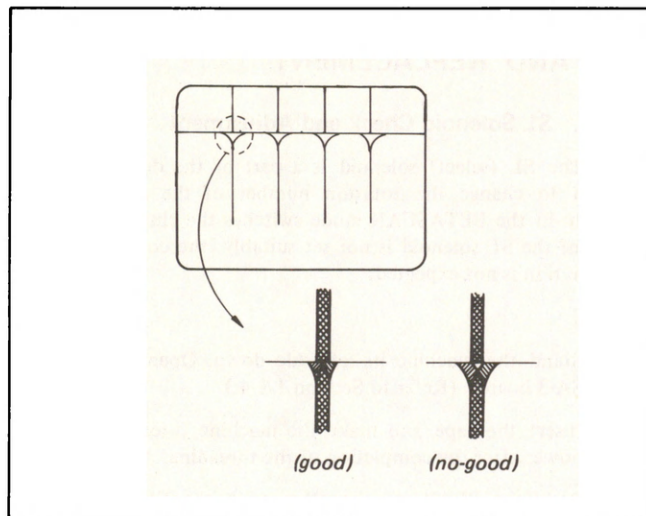


Fig. 3-55.

- When the dihedron is no-good, the preparation of the video head dihedron adjustment is to install two dihedron adjusting screws in the holes close to the small mark (●) shown in Fig. 3-56 and tighten them until the screw heads are level with the top surface of the video head disk. (If the screws are not tightened until their heads become level with the surface, the upper drum of the video head disk is caught by the adjusting screw heads and the video head disk cannot rotate. If the screws are tightened excessively, the head base is moved and the dihedron distortion becomes larger.)

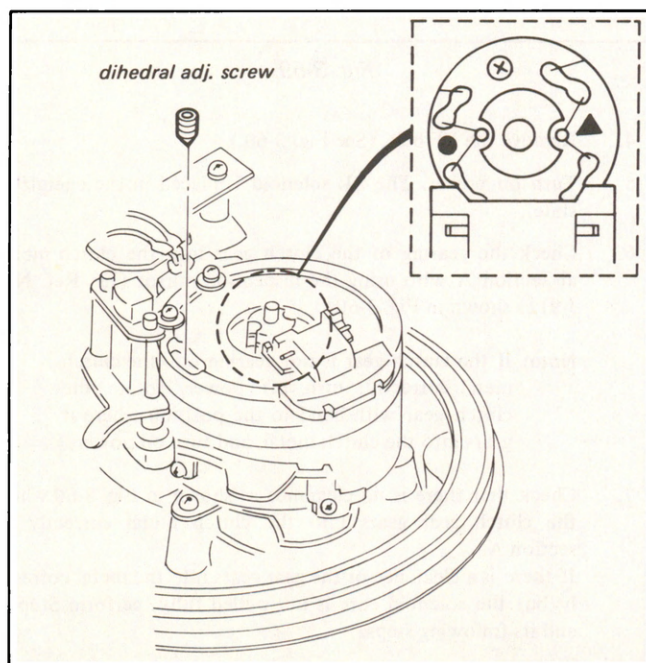


Fig. 3-56.

When the dihedron is no-good;

- (1) When the split becomes small for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-57 and is tracing the magnetic pattern on the tape. The adjusting screw in adjustment hole E shown in the figure must be tightened further to shift the B head in the left direction until the good dihedron shown in Fig. 3-55 is obtained.

Set the TRACKING control knob to the center detent point.

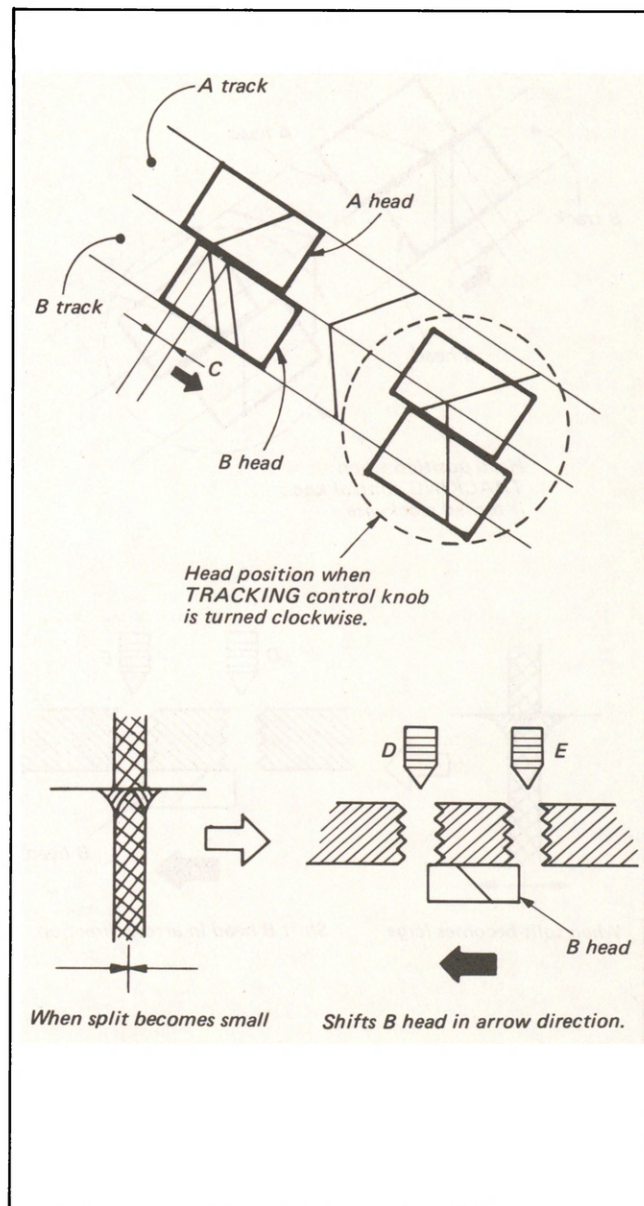


Fig. 3-57.

- (2) When the split becomes large for the clockwise turn of the TRACKING control knob, the B head shifts by C in the arrow direction as shown in Fig. 3-58 and is tracing the magnetic pattern. The adjusting screw in adjustment hole D shown in the figure, must be tightened further to shift the B head in the right direction until the good dihedron shown in Fig. 3-55 is obtained. Set the TRACKING control knob to the center detent point.

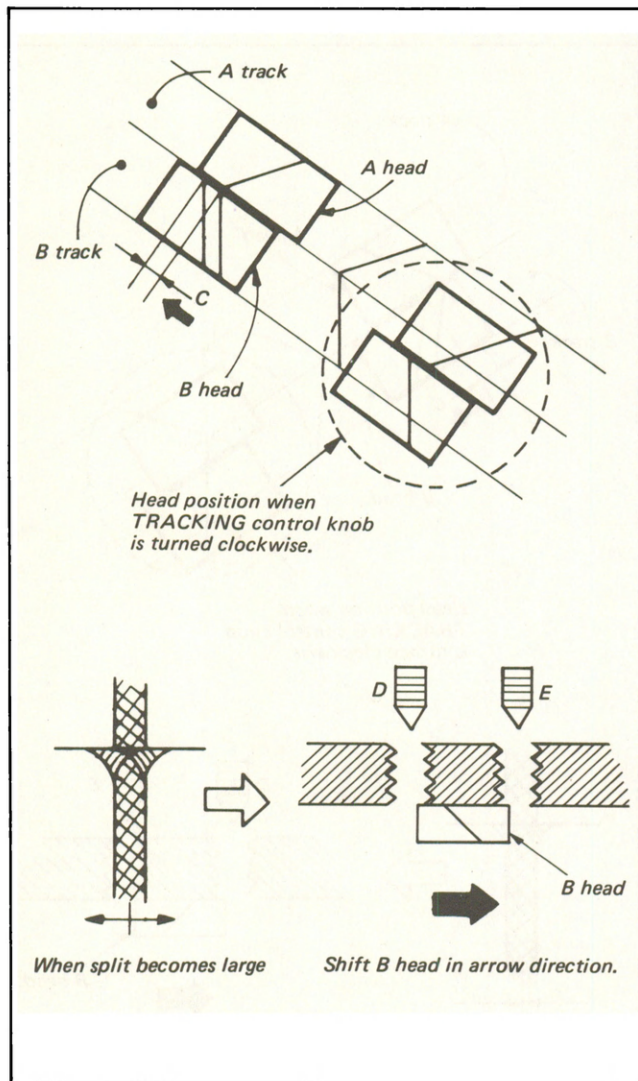


Fig. 3-58.

- (3) Remove the adjusting screws after the completion of the adjustment and check the dihedron again.

3-21. FUNCTION SOLENOID ADJUSTMENT AND REPLACEMENT

3-21-1. SL Solenoid Check and Adjustment

The SL (select) solenoid is a part of the deceleration mechanism to change the rotation number of the midway pulley assembly in the BETASCAN mode switches the clutch gear. If the stroke of the SL solenoid is not set suitably, the correct decelerating operation is not expected.

[Check]

1. Stand the machine its left side down. Open the YC-4 and SA-3 boards. (Refer to Section 1-1-4.)
2. Insert the tape and make the machine thread it. Turn off power after the completion of the threading.
3. Push the PLAY key together with the FF key and clip these keys with a clip as shown in Fig. 3-59.

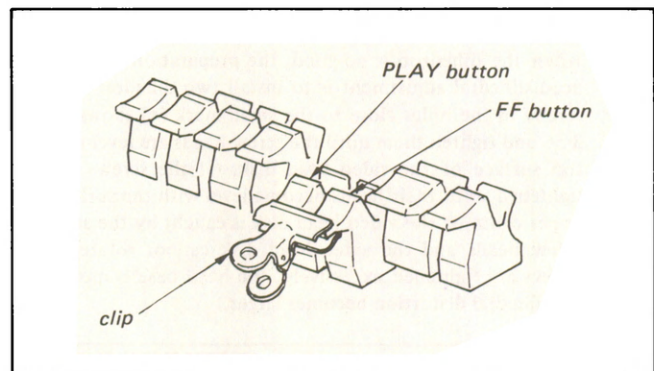


Fig. 3-59.

4. Remove the FF belt. (See Fig. 3-60.)
5. Turn on power. The SL solenoid is placed in the energized state.
6. Check the gearing of the clutch gear into the clutch metal at section A with using the inspection mirror (Jig. Ref. No. J-9) as shown in Fig. 3-60.

Note: If the clutch gear is not gearing into the clutch metal correctly, turn off power, rotate the clutch gear with hand to the position where it gears into the clutch metal, and turn on power.

7. Check that there is no clearance as shown in Fig. 3-60 when the clutch gear gears into the clutch metal correctly at section A. If there is a clearance or the gear gears into the metal correctly but the solenoid core is not pulled fully, perform Step 8 and its following steps.

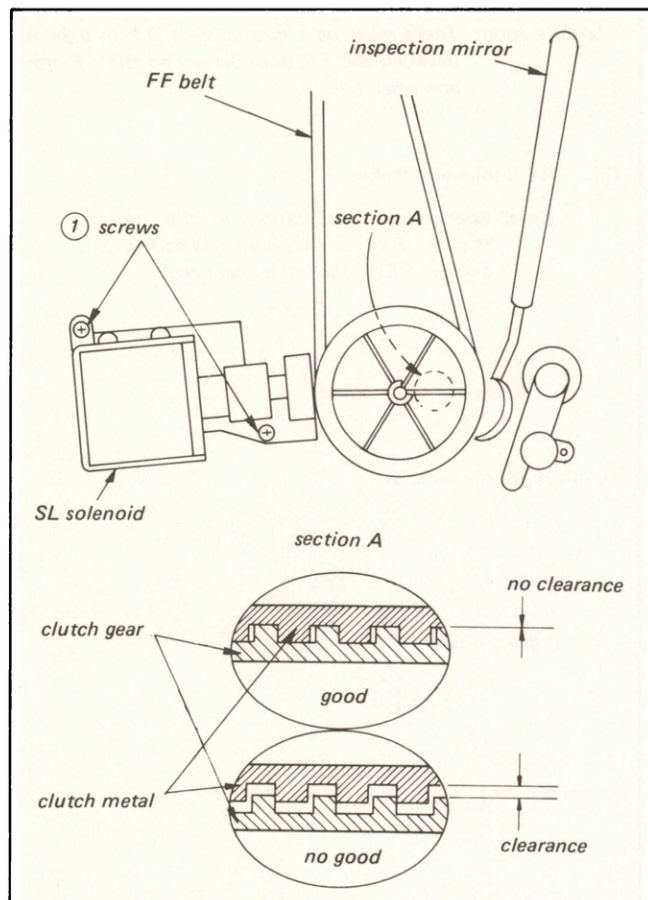


Fig. 3-60.

[Adjustment]

8. Loosen two screws (1) shown in Fig. 3-61 and move the SL solenoid in the direction shown by arrow A.
9. Move the SL solenoid in the arrow B direction so that the specification shown in Fig. 3-60 is satisfied, and fix the two screws (1). (See Fig. 3-61.)
10. Install the FF belt, insert the cassette, and check the movement of the SL solenoid.

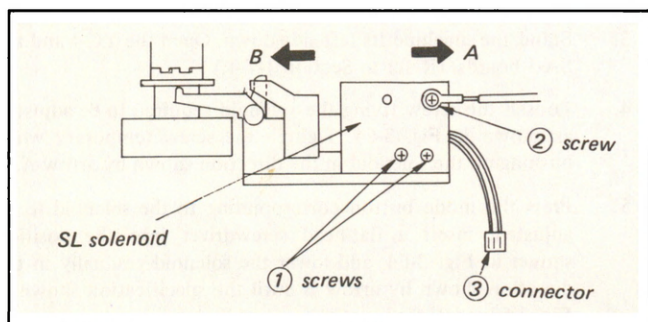


Fig. 3-61.

3-21-2. SL Solenoid Replacement

- The SL solenoid must be replaced when the suitable position of the solenoid cannot be obtained in the adjustment in Section 3-21-1.
1. Remove two screws (1) shown in Fig. 3-60.
 2. Remove screw (2) and connector (3) shown in Fig. 3-61. Then the solenoid can be removed.
 3. After mounting the solenoid, perform "SL Solenoid Check and Adjustment", Section 3-21-1.

3-21-3. Clutch Pulley Block Assembly Replacement

- The clutch gear or the clutch pulley block assembly must be replaced when the clutch gear shown in Fig. 3-62 does not rotate smoothly.
1. Remove the SL solenoid as did in Section 3-21-2.
 2. Remove the FF belt.
 3. Remove the cassette-up block assembly.
 4. Bend the projections of the midway pulley assembly as shown in Fig. 3-62 and pull the clutch pulley block assembly in the direction indicated by arrow A. Mount the replacement clutch pulley block assembly.
- Note:** Do not lose polyslider on the shaft.
5. Perform "SL Solenoid Check and Adjustment", Section 3-21-1, after the mounting.

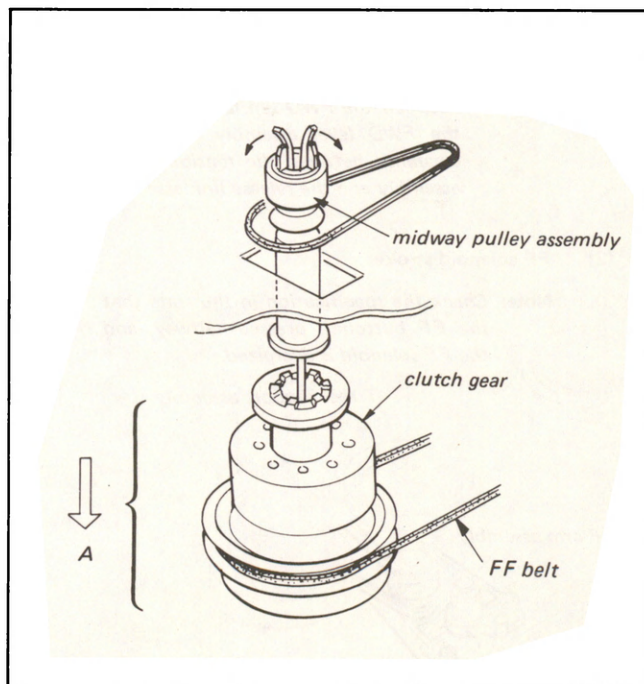


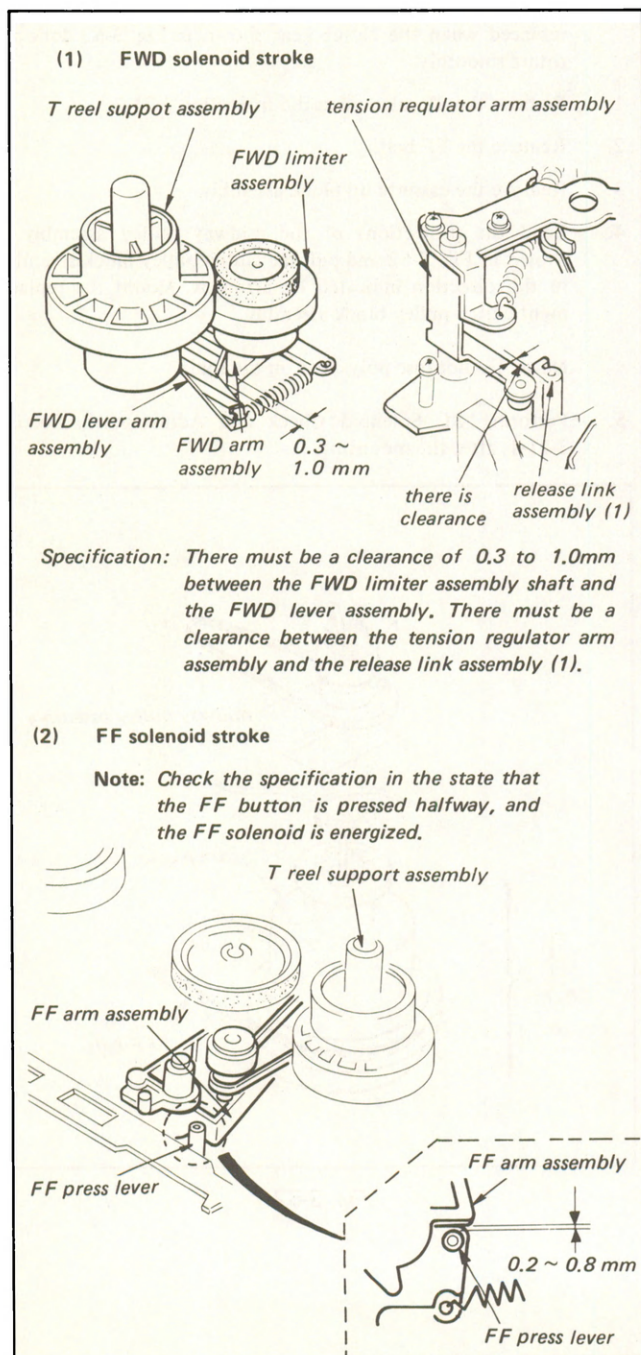
Fig. 3-62.

3-21-4. PLAY, FF and REW Solenoid Checks and Adjustments

- The PLAY, FF and REW solenoids, each has an important role for driving the tape and a careful adjustment is necessary.

[Check]

- Set up the STOP mode without the cassette inserted. (Refer to Section 1-3.)
- Check that the each stroke of the PLAY, FF and REW solenoids satisfies the specification shown in Fig. 3-63. If the specification is not satisfied, perform Step 3 and the following steps.



Specification: There must be a clearance of 0.2 to 0.8mm between the FF press lever and the FF arm assembly.

(3) REW solenoid stroke

Note: Check the specification in the state that the REW button is pressed halfway, and the REW solenoid is energized.

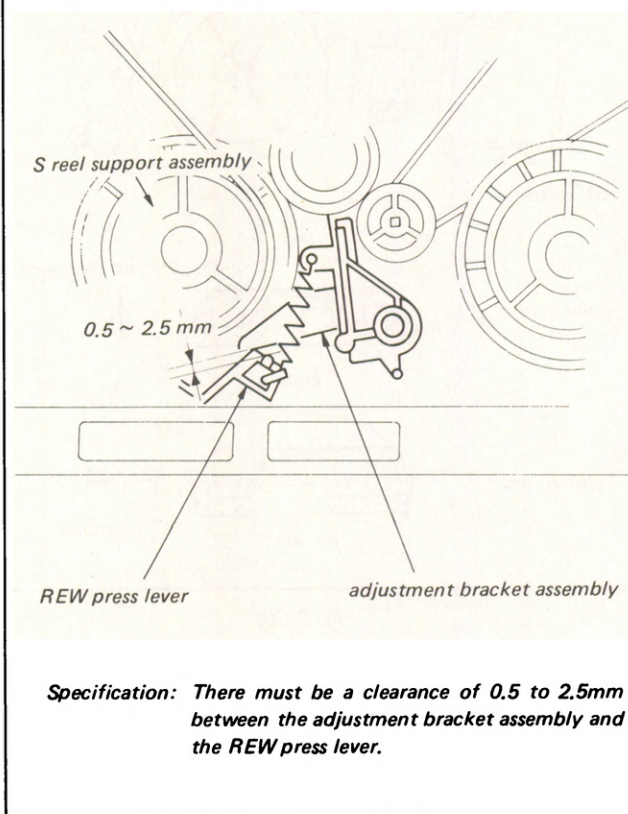


Fig. 3-63.

[Adjustment]

- Stand the machine its left side down. Open the YC-4 and the SA-3 boards. (Refer to Section 1-1-4.)
 - Loosen the screw fixing the solenoid required to be adjusted as shown in Fig. 3-64. Tighten the screw temporary while pushing up the solenoid in the direction shown by arrow A.
 - Press the mode button corresponding to the solenoid to be adjusted, insert a flat-head screwdriver into the position shown in Fig. 3-64, and lower the solenoid gradually in the direction shown by arrow B until the specification shown in Fig. 3-63 is satisfied.
- Note: The check must be done when the FF or the REW key is pressed halfway, and the solenoid is energized.
- Tighten the screw of the solenoid.
 - Insert the tape into the machine and check the operation.

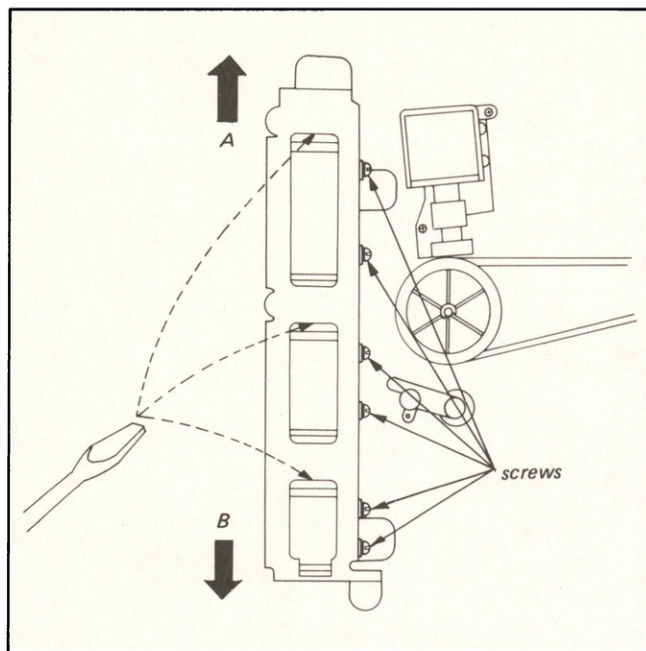


Fig. 3-64.

3-21-5. PLAY, FF and REW Solenoid Replacements

1. Remove the six screws shown in Fig. 3-65.
2. Move the DS-3 board and the tuner block in the direction shown by the arrow. (See Fig. 3-65.)

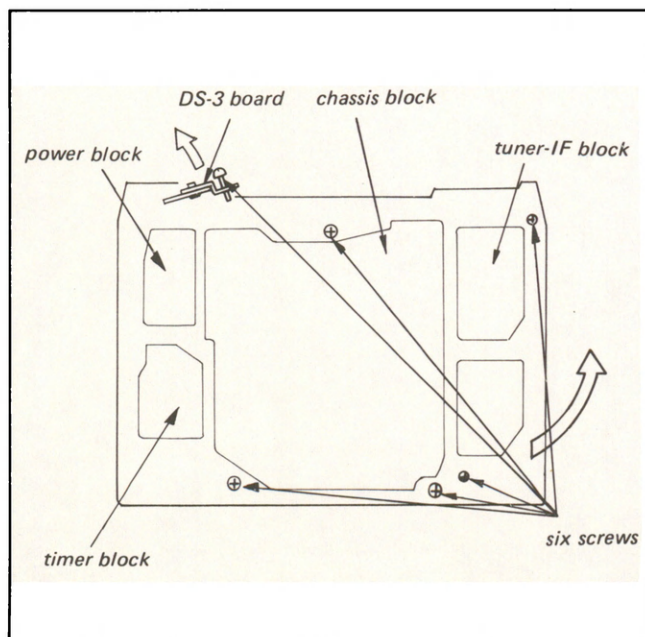


Fig. 3-65.

3. Pull up the drum base edge close to you and keep it from falling by a stick in 20cm length or a screwdriver as shown in Fig. 3-66.
4. Remove three screws ① and two connectors ② and ③ shown in Fig. 3-66. The PLAY, FF and REW solenoids can be replaced.

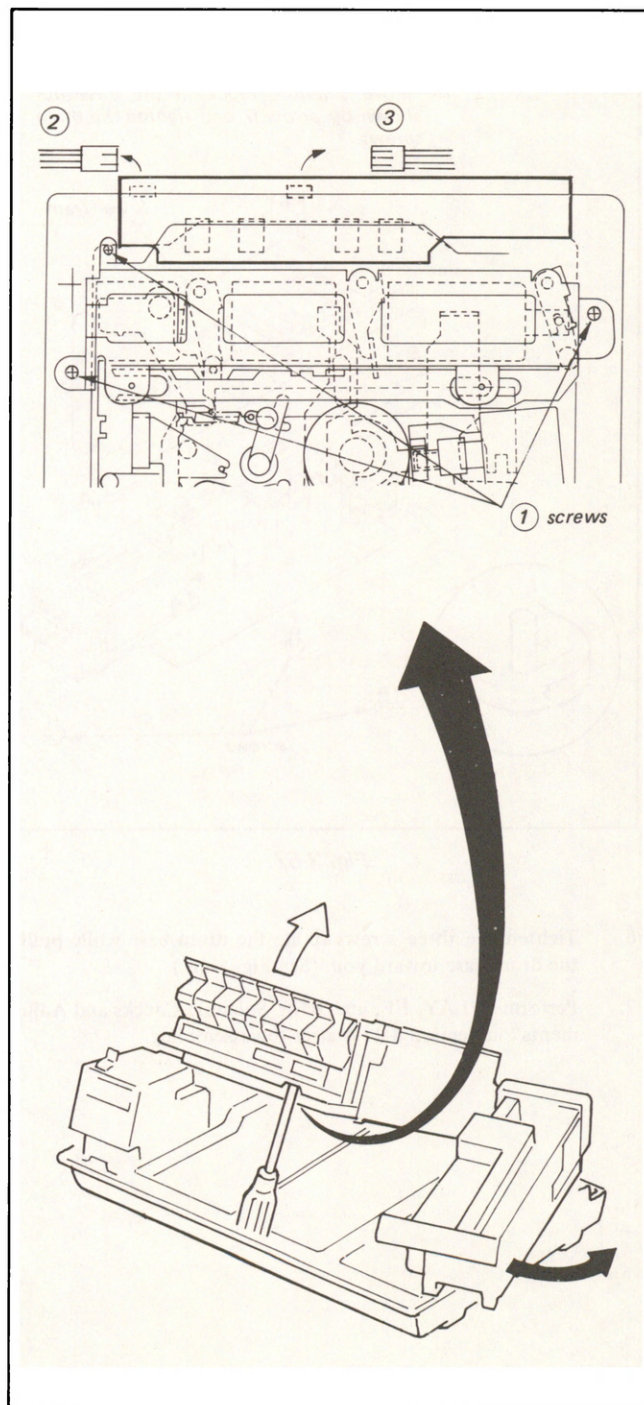


Fig. 3-66.

5. Note the three points stated in Fig. 3-67 for mounting the solenoid on the drum base.

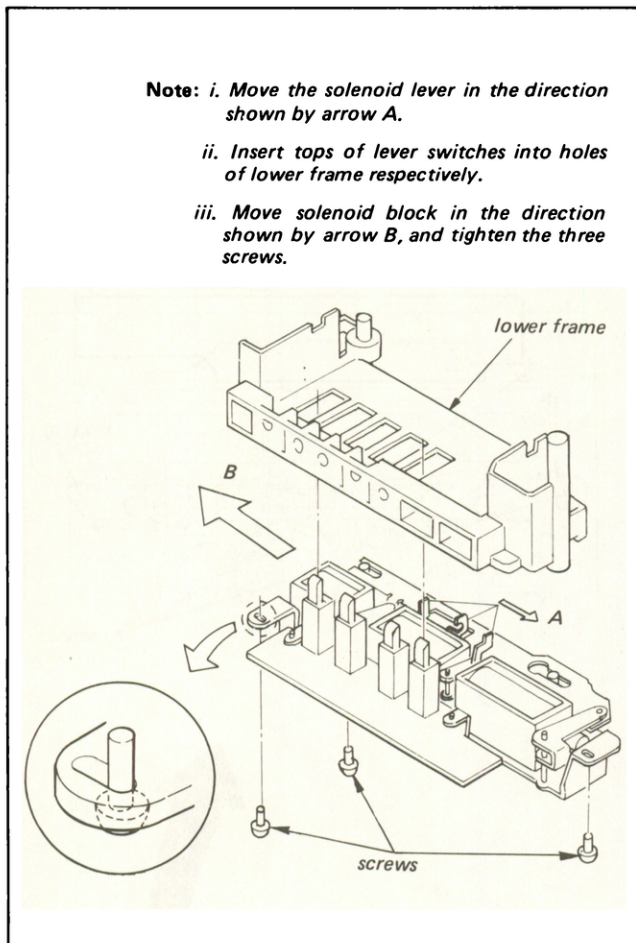


Fig. 3-67.

6. Tighten the three screws fixing the drum base while pulling the drum base toward you. (See Fig. 3-66.)
7. Perform "PLAY, FF, and REW Solenoid Checks and Adjustments" in Section 3-21-4 after the assembling.

SECTION 4

ELECTRICAL ALIGNMENT

This section provides all necessary information and instructions for complete alignment of the electronic circuits in this machine.

EQUIPMENT REQUIRED

- (1) Color TV receiver
- (2) Oscilloscope Single or Dual-trace, Bandwidth . more than 15 MHz with delay mode
- (3) Frequency counter (more than four digits)
- (4) NTSC pattern generator
- (5) VTVM
- (6) VOM (20 k Ω /V)
- (7) Audio signal generator
- (8) Audio attenuator
- (9) Alignment tape Type KR5-1S Code No. 8-969-995-71
- (10) Alignment tool (adjusting screwdriver for semi-fixed resistor coil)

[Preparatory Set-up for Alignment]

For these alignment procedures involving use of a video input signal the NTSC pattern generator is to be connected to the VHF antenna terminals of the SL-5400. This RF signal is processed by the tuner and I.F. circuits within the VTR. It is important that the video out signal from the I.F. circuit satisfies the specifications. The video signal must be checked with an oscilloscope connected to TP-1 on the YC-4 board. Verify that the sync signal amplitude is approx. 0.3 Vp-p that the video signal amplitude is approx. 0.7 Vp-p. Adjust the fine tuning while observing the signal on the scope and on the TV screen so that the color burst amplitude becomes approx. $0.3V \pm 0.1V$ p-p. Also confirm that there are no spikes observed at the sync signal portion of the signal.

The video (color bar) signal for the alignment is shown in Fig. 4-1.

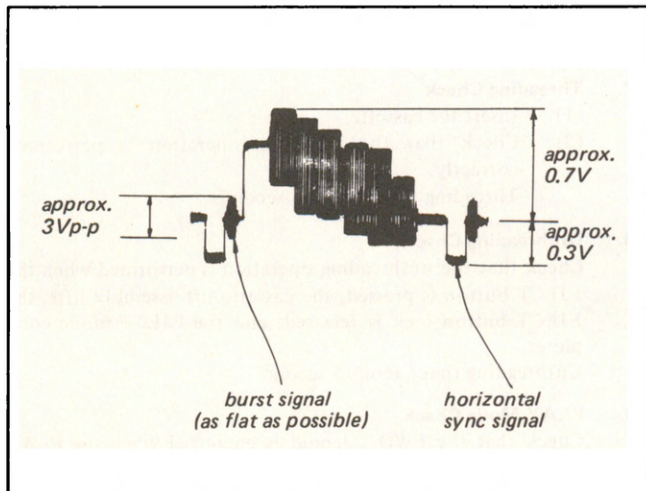


Fig. 4-1. Video (color bar) signal

[Alignment Tape]

KR5-1S

Tape speed	Video signal	Audio signal	Playing time
20.0mm/sec. (β II)	Color bars	3kHz -5dB	4 min. for each segment
	Monoscope (dihedral)	333Hz -25dB	
	RF sweep	5kHz -25dB	
	1MHz (A ch)	1kHz -5dB	
13.3mm/sec. (β III)	Color bars	3kHz -5dB	
	Monoscope	5kHz -25dB	
	RF sweep	333Hz -5dB	

[Alignment tool for VR]

Semi-fixed variable resistors and inductances should be adjusted with the alignment tool, exclusively prepared for the adjustment of the components. A common screwdriver is too large for adjusting the components from the conductor side of a printed circuit board. (See Fig. 4-2.)

The metal blade of the alignment tool is used for variable resistors and trimmer capacitors, and the plastic tip for variable inductances.

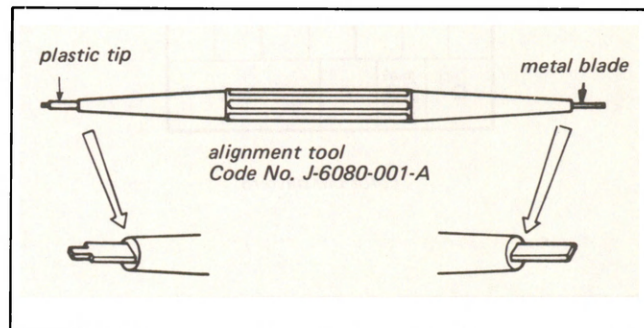


Fig. 4-2. Alignment tool

[Required Levels and Impedances of Input and Output]

VIDEO

Input VIDEO IN;
phono-type connector
1.0 Vp-p 75 ohms,
unbalanced, sync negative

Output VIDEO OUT;
phono-type connector
1.0 Vp-p 75 ohms
unbalanced, sync negative

AUDIO

Input AUDIO IN;
mini jack, 100 k ohms, -10 dB
MIC:
mini jack, -60 dB, suitable for
microphone with 600-ohm
impedance

Output AUDIO OUT;
mini jack, less than 10 k ohms,
-5 dB (100 k ohm load), unbalanced

[Color Bar Signal]

The 75% color bar signal recorded on the alignment tape is shown in Fig. 4-3.

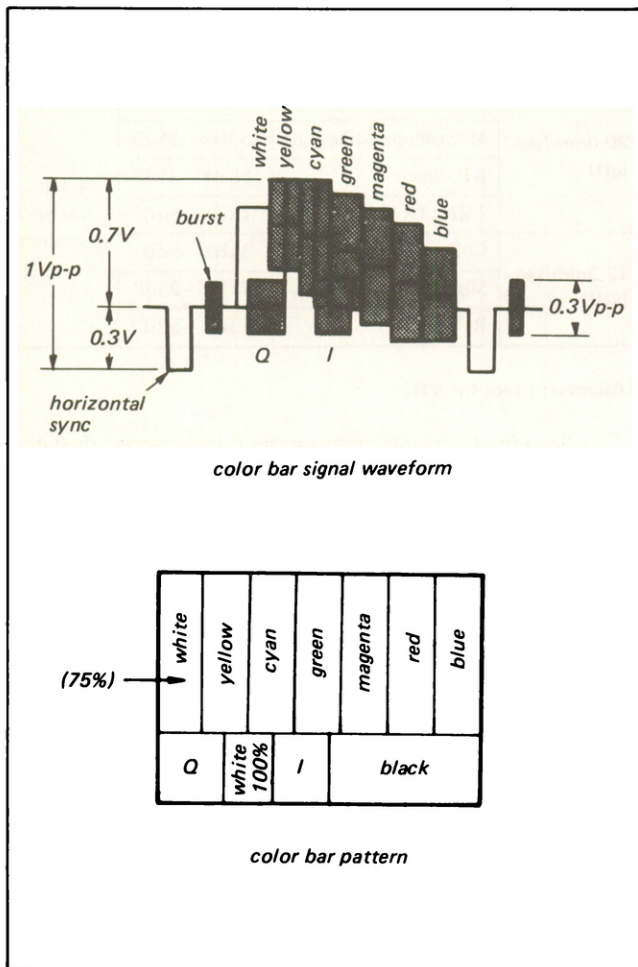
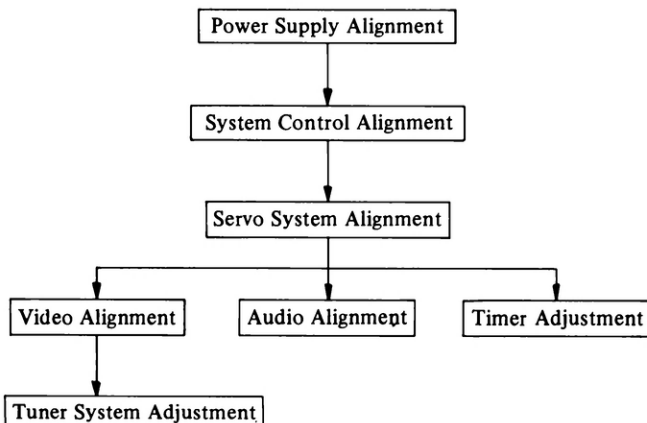


Fig. 4-3. 75% color bar signal recorded on the alignment tape

[Alignment Sequence]

The alignment should be performed following the sequence below.



4-1. POWER SUPPLY ALIGNMENT AND CHECK (PS-4 board)

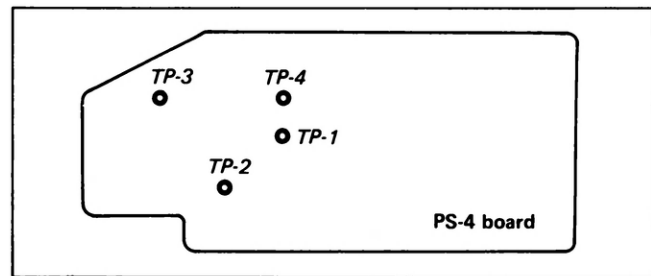


Fig. 4-4. Test Points on PS-4 board

1. REG 12 V Adjustment

- (1) Check that the input voltage is 120 V ac $\pm 10\%$.
- (2) Connect the VOM to TP1.
- (3) Adjust RV001 for a 12 V ± 0.1 V reading.

2. 10 V Check

- (1) Connect the VOM to TP4.
- (2) Check that the reading is 10.2 V ± 0.7 V.

3. SYS 12 V Check

- (1) Check that the voltage at TP1 is 12 V.
- (2) Connect the VOM to TP3.
- (3) Check that the reading is 12 V ± 1 V.

4-2. SYSTEM CONTROL ALIGNMENT AND CHECK (SY-5 board)

1. Clock Oscillating Frequency Adjustment

- (1) Connect the frequency counter to pin 42 of IC1.
- (2) Adjust L003 for a reading of 400 kHz ± 12 kHz.

Note: L003 is mounted on the component side of the board which must be turned over for access to this adjustment. In addition, coil L003 is under a sub-board that must be loosened to adjust L003. Alternate method for measuring clock frequency, using oscilloscope:

- (1) Connect scope to pin 42 of IC001.
- (2) Sine wave on scope screen should have a cycle period of 2,427 to 2,577 microseconds.

2. Threading Check

- (1) Insert the cassette.
- (2) Check that the threading operation is performed correctly.
Threading time: about 4 seconds

3. Unthreading Check

Check that the unthreading operation is performed when the EJECT button is pressed, the cassette lift assembly lifts, the EJECT button lock is released, and the EJECT mode completes.
Unthreading time: about 5 second

4. PLAY Mode Check

Check that the FWD solenoid is energized when the PLAY button is pressed, the drum motor starts rotation, and the pinch solenoid is energized.
Pinch solenoid delay time: about 0.5 second

5. BETA SCAN Mode Check

- (1) Set up the PLAY mode.
- (2) Check that the FF/CUE solenoid is energized during the time that FF button is kept depressed and the pinch solenoid is deenergized.
- (3) Check that the FF/CUE solenoid is deenergized, the pinch solenoid is energized when the FF button is released and the PLAY mode is set up again.
- (4) Check that the REW/REVIEW solenoid is energized and the pinch solenoid is de-energized during the time that the REW button is kept depressed.
- (5) Check that the REW/REVIEW solenoid is deenergized and the pinch solenoid is energized when the REW button is released, and the PLAY mode set up again.
- (6) Check that the STOP mode is set up and the PLAY button lock is released after the operations, PLAY-BETA SCAN-PLAY-BETA SCAN are repeated more than 15 times during a five second period.
- (7) Check that the machine operates as checked in Check Items (1) to (6) when the Beta Scan control unit is used in combination with the machine.

6. PAUSE Mode Check

- (1) Check that the pinch solenoid is de-energized when the PAUSE button is depressed, the brake solenoid is energized and the reel table rotation stops.
- (2) Check that the pinch solenoid is energized when the PAUSE button is depressed again, the brake solenoid is de-energized, and the reel table starts rotation.
- (3) Check that Check Items (1) and (2) are satisfied when the Beta Scan control unit is used together with the machine.

7. AUTO-STOP Check

- (1) Check that the AUTO-STOP mode is set up at the metal tape portion (end of tape), the button lock is released, and the STOP mode is set up.
- (2) Check that the button lock is released when a piece of iron is placed near the FWD sensor in the PLAY, FF, and REC modes, and the REW sensor in the REW mode and the STOP mode is set up.

8. Counter Memory Check

- (1) Turn on the MEMORY ON/OFF switch.
- (2) Set up the REW mode.
- (3) Check that the AUTO-STOP is set up and the button lock is released when the tape counter reaches 9999.
- (4) Check that the REW mode is set up and the tape is re-wound when the REW button is depressed again.

9. Slack Sensor Check

- (1) Check that the AUTO-STOP is set up when the tape is slackened intentionally and the key lock is released.
- (2) Repeat Check (1) two more times. Check that the mode other than the EJECT is not set up after repeating Check (1) three times in total. Even if the key is locked, the mode corresponding to the key is not set up.
- (3) The reset is set up when the EJECT button is depressed once and any mode can be set up again.

4-3. SERVO SYSTEM ALIGNMENT

4-3-1. Drum Servo System Alignment

1. Drum Free Speed Adjustment (SA-3 board)

- (1) Insert a cassette and set up the REC mode Beta II or Beta III.
- (2) Connect the oscilloscope CH-1 probe to pin 6 of IC1 and its CH-2 probe to pin 7 of IC1.
- (3) Check that the RF waveform is locked as shown in Fig. 4-5.

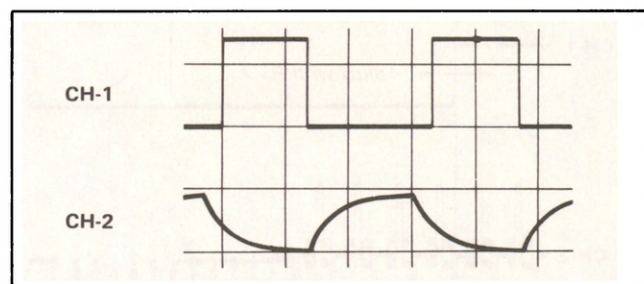


Fig. 4-5. Drum free speed adjustment

- (4) Connect the oscilloscope to TP002. Input: DC range
- (5) Adjust RV8 for a DC level of $5.2\text{ V} \pm 0.3\text{ V}$. (See Fig. 4-6.)

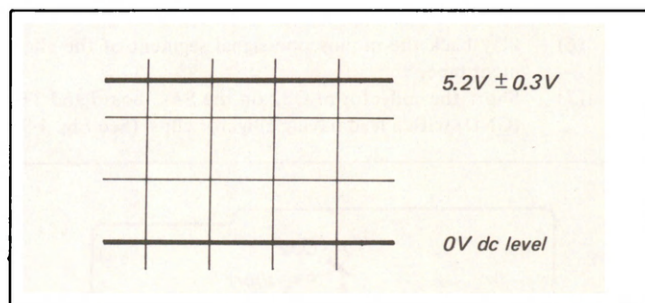


Fig. 4-6. Drum free speed adjustment

2. RF Switching Position Adjustment (YC-4, RP-1 & SA-3 boards)

- (1) Play back the color bar (β II mode) segment.
- (2) Connect the oscilloscope to TP4 on the RP-1 board.
- (3) Adjust the TRACKING knob so that the waveform amplitude becomes maximum. (See Fig. 4-7.)

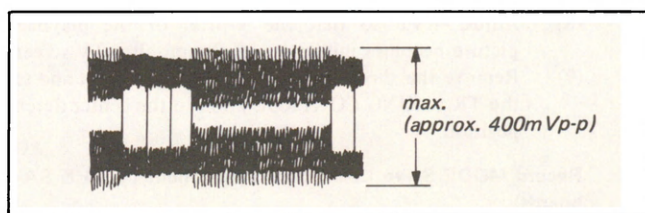


Fig. 4-7. RF output waveform

- (4) Connect the oscilloscope CH-1 probe to TP001 on the SA-3 board and the CH-2 probe to TP11 on the YC-4 board.
- (5) Adjust RV2 on the SA-3 board so that the time between the falling portion of the CH-1 waveform and the vertical sync signal of the CH-2 video signal is $7H \pm 1H$ lines. (See Fig. 4-8.)

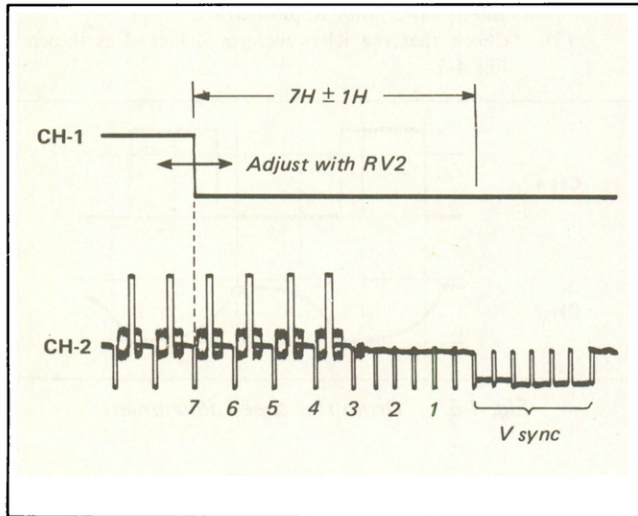


Fig. 4-8. RF switching position adjustment (1)

- (6) Play back the monoscope signal segment of the alignment tape.
- (7) Short the collector of Q32 on the SA-3 board and TP3 (GND) with a lead having alligator clips. (See Fig. 4-9.)

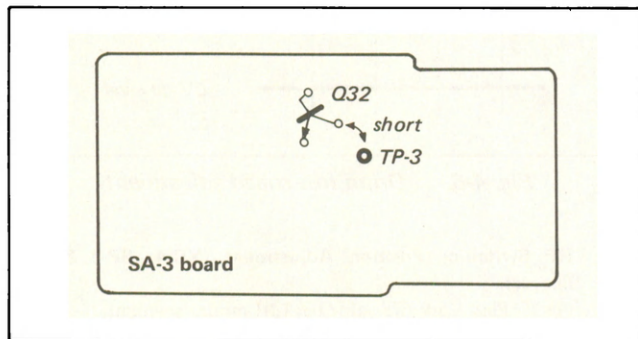


Fig. 4-9. RF switching position adjustment (2)

- (8) Adjust RV1 so that the V-jitter of the playback picture becomes minimum on the monitor TV screen.
- (9) Remove the shorting lead after the adjustment and set the TRACKING CONTROL knob to the center detent position.

3. Record MODE Servo Lock Phase Adjustment (YC-4 & SA-3 boards)

- (1) Supply the video signal to the machine and record it.
- (2) Connect the oscilloscope CH-1 probe to TP001 on the SA-3 board and the CH-2 probe to TP11 on the YC-4 board.
- (3) Adjust RV3 on the SA-3 board so that the time between the falling portion of the CH-1 waveform and the vertical sync signal of the CH-2 video signal is $7H \pm 1H$ lines. (See Fig. 4-10.)

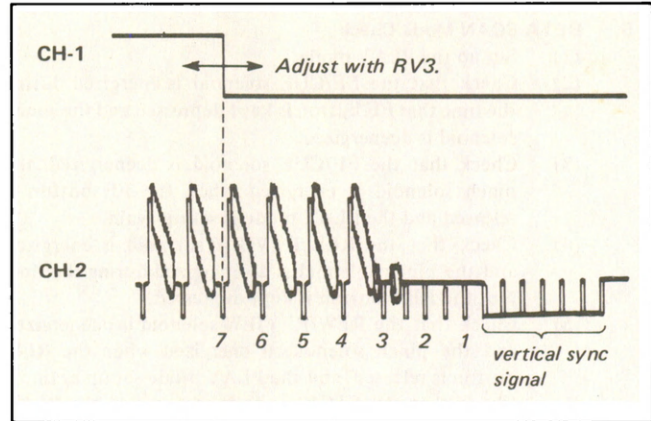


Fig. 4-10. Record-servo lock phase adjustment

4. BETA SCAN (CUE/REVIEW), Drum Free Speed Adjustment (YC-4 & DS-3 boards)

- (1) Receive a telecast signal.
- (2) Record the signal in the β III mode on the center section of the L-500 cassette tape (in the state that the tape amounts on the take-up and the supply reel tables are equal).
- (3) Connect the oscilloscope to TP15 on the YC-4 board.
- (4) Play back the recorded portion.
- (5) Position the positive-going edge of the waveform at the exact center of the oscilloscope scale. (See Fig. 4-11.)

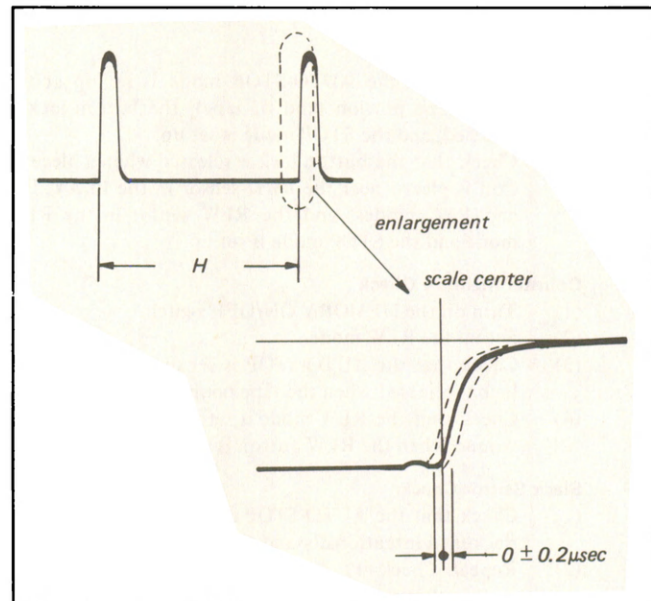


Fig. 4-11. BETA SCAN (CUE/REVIEW) free speed adjustment

- (6) Depress FF (CUE) button on machine.
- (7) Adjust RV401 on the DS-3 board so that the deviation (jitter) of the rising section from the scale center (at the center of shaking) is $0 \pm 0.2 \mu\text{sec}$. (See Fig. 4-11.)
- (8) Depress REWIND (REVIEW) button on machine.
- (9) Adjust RV402 on the DS-3 board so that the deviation (jitter) of the rising section from the scale center (at the center of shaking) is $0 \pm 0.2 \mu\text{sec}$. (See Fig. 4-11.)

4-3-2. Capstan Servo System Alignment

1. Capstan Free Speed Adjustment (SA-3 board)

- (1) Play back the β II mode of the alignment tape.
- (2) Connect the oscilloscope CH-1 probe to pin 19 of IC2 and the CH-2 probe to pin 20 of IC2.
- (3) Set the TAPE SPEED switch (S4, rear of the set) to β I.
- (4) Adjust RV5 for the phase lock shown in Fig. 4-12.

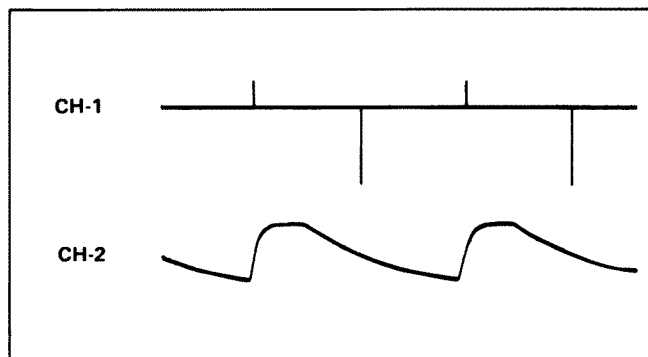


Fig. 4-12. Phase lock

- (5) Connect the oscilloscope to TP5. Input: dc range
- (6) Adjust RV5 for a dc level of $5.5V \pm 0.3V$. (See Fig. 4-13.)
- (7) Set the TAPE SPEED switch to β II, β III.
- (8) Record the telecast signal in the β III mode and adjust RV4 for $5.5V \pm 0.3V$. (See Fig. 4-13.)
- (9) Record the telecast signal in the β II mode and adjust RV11 for $5.5V \pm 0.3V$.
- (10) Play back the β II mode of the alignment tape (color-bar or monoscope) with FAST PLAY button pushed and adjust RV10 for $5.5V \pm 0.3V$.

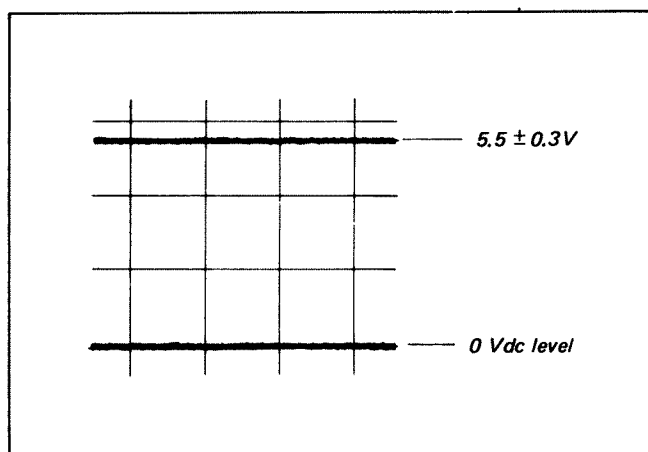


Fig. 4-13. Capstan free speed adjustment

2. Tracking Control Center Adjustment (SA-3 board)

- (1) Set the TRACKING CONTROL knob to its center detent position.
- (2) Play back the β II mode segment of the alignment tape.
- (3) Connect the oscilloscope CH-1 probe to TP7 and the CH-2 probe to TP6.
- (4) Adjust RV6 so that the phase of the CH-1 negative-going edge is the same as that of the CH-2 negative-going edge. (See Fig. 4-14.)

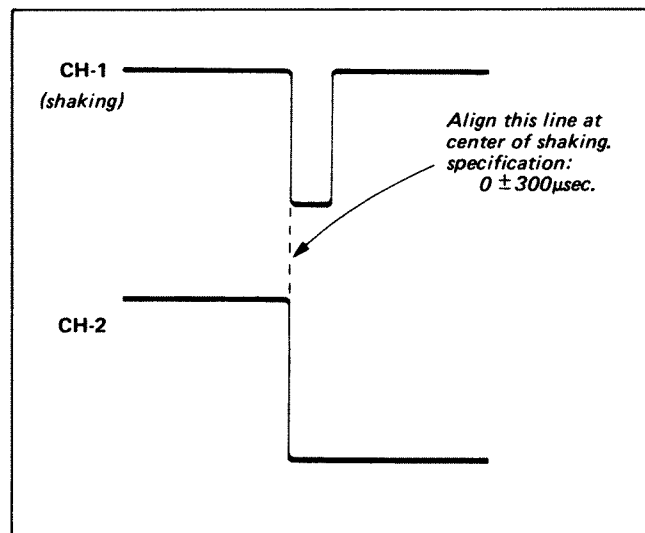


Fig. 4-14. Tracking control center adjustment

3. Tape Speed Detection Adjustment (SA-3 board)

- (1) Play back the β II mode of the alignment tape.
- (2) Connect the oscilloscope to the collector of Q36. Input: DC range
- (3) Adjust RV7 so that the waveform peak is $7.35V \pm 0.2V$. (See Fig. 4-15.)

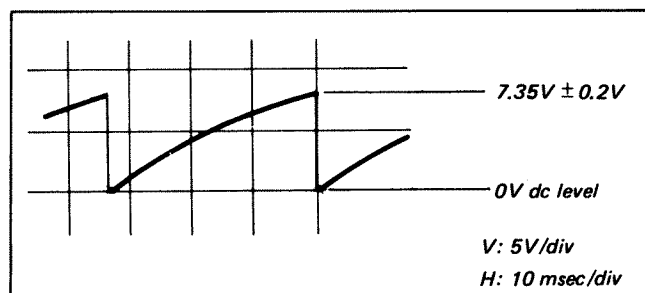


Fig. 4-15. Tape speed detection adjustment

4. Fast Play Noise Position Adjustment (SA-3 board)

- (1) Record the telecast signal in the β II mode.
- (2) Set the TRACKING knob to its center detent position.
- (3) Play back the recorded portion with FAST PLAY button depressed.
- (4) Adjust RV9 so that noise disappears on the monitor screen. (See Fig. 4-16.)

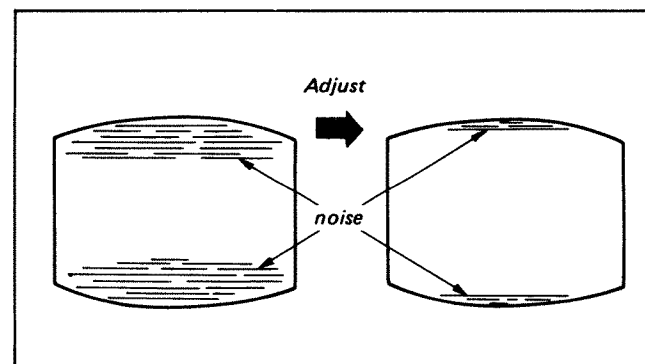


Fig. 4-16. Fast play noise position adjustment

4-3-3. 0.5H Compensation Circuitly Adjustment

1. 0.5H jumping detection VCO adjustment (CR-6 board)

- (1) Play back the β II mode of the alignment tape.
- (2) Connect the oscilloscope to point (A) shown in Fig. 4-17. (Input; dc range)

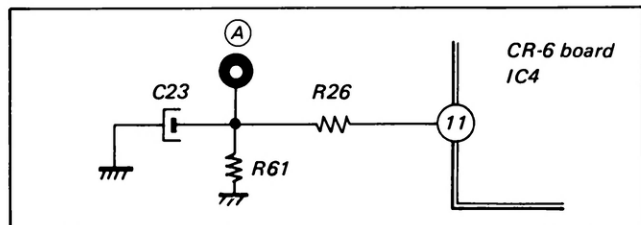


Fig. 4-17. Measurement point

- (3) Adjust RV4 for $3.2V \pm 0.1V$

2. Bias voltage adjustment (CR-6 board)

- (1) Set up the E-E mode (Insert the cassette and set up the STOP mode.), and no-signal condition at the VIDEO IN. Move "CAMERA/TUNER" selector switch to CAMERA position.
- (2) Connect the oscilloscope to pin 8 of IC2. (Input range; dc)
- (3) Adjust RV2 for $7V \pm 0.3V$. (See Fig. 4-18.)

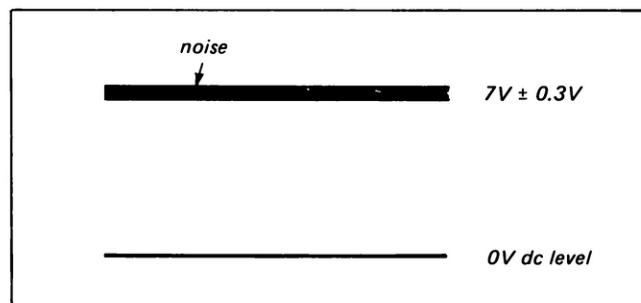


Fig. 4-18. Bias voltage adjustment

3. Carrier waveform phase adjustment

- (1) Supply the color-bar signal and set up the E-E mode.
- (2) Connect the oscilloscope to pin 8 of IC2.
- (3) Adjust VL1 for maximum waveform. (See Fig. 4-19.)

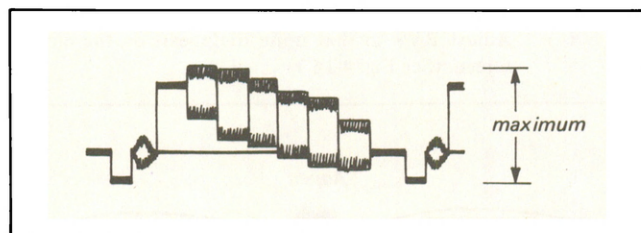


Fig. 4-19. Carrier waveform phase adjustment

4. Video Y level deviation adjustment (CR-6 board)

- (1) Play back the β II mode of alignment tape with FAST PLAY button pushed.
- (2) Connect the oscilloscope to pin 1 of IC5 on the CR-6 board.
TRIG; EXT TP-3 on the RP-1 board
- (3) Adjust RV1 so that the level deviation between A-CH and B-CH is the minimum.

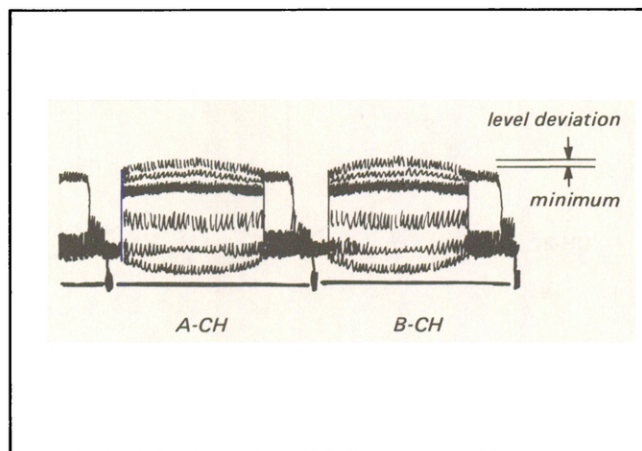


Fig. 4-20. Video Y level deviation adjustment

- (4) Make sure that flicker is the minimum on the monitor screen.
(Note; Color level of monitor television should be minimum.)

5. Video chroma level deviation adjustment (CR-6 and RP-1 boards)

- (1) Play back the color-bar signal segment of β II mode of alignment tape with FAST PLAY button pushed.
- (2) Connect the oscilloscope to pin 1 of IC5 on the CR-6 board. (See Fig. 4-21.)

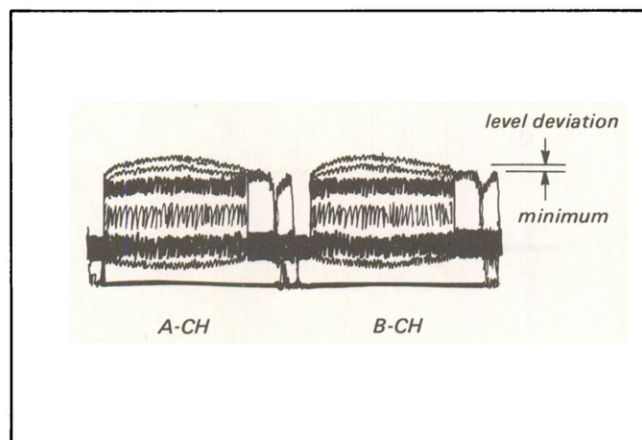


Fig. 4-21. Video chroma level deviation adjustment

4-4. VIDEO SYSTEM ALIGNMENT (RP-1 & YC-4 boards)

The playback system is aligned first with the alignment tape, and the record system is aligned after the playback system is confirmed to operate properly.

The alignment sequence is shown below. The Y-signal and chroma signal systems are aligned for each of the playback and the record systems.

The color video signal supplied from the tuner-I.F. block, is utilized as the video input signal for the video system alignment in the RECORD mode. It is important to check that the sync and color burst signals satisfy the required specification shown in Fig. 4-1. (Preparatory let-up for alignment.)

[Playback System Alignment]

1. Playback Amplifier Frequency Response Adjustment
2. Dropout Compensator threshold Adjustment
3. Playback Video Output Level Adjustment
4. Noise canceller II Adjustment
5. 3.58 MHz Oscillator Frequency Adjustment
6. VCO Free Frequency Adjustment and VCO Lock Check

[Record System Alignment]

7. E-E Video Output Level (Peak AGC) Adjustment
8. AGC Adjustment
9. Comb Filter Adjustment and Color Video Level Adjustment
10. Sync Tip Carrier Frequency Set and FM Modulator Deviation Adjustment
11. ACC Adjustment
12. 4.27 MHz Carrier Leak Adjustment
13. White Clip Adjustment
14. Dark Clip Adjustment
15. Hard Clamp Adjustment
16. Y-FMRecord Current Adjustment
17. Chroma Record Current Adjustment

[Setting for Alignment]

- Connect a color television receiver to the VHF OUT terminal.
- Set the TRACKING CONTROL knob to the center detent position unless otherwise instructed.

1. Playback Amplifier Frequency Characteristic Adjustment (RP-1 board)

The CH-A and CH-B amplifiers require independent frequency characteristic adjustments. The adjustment for the CH-B is indicated in parentheses.

- (1) Play back the Beta II RF sweep signal segment of the alignment tape.
- (2) Connect the oscilloscope to TP4 and trigger it externally from TP3. Select the negative (–) trigger slope to observe the CH-A signal and the positive (+) one to observe the CH-B signal.

- (3) Turn the TRACKING CONTROL knob for maximum RF output level.
- (4) Adjust RV6 (RV5) so that the level between 2 MHz and 5.1 MHz is flat. (See Fig. 4-22.)
- (5) Adjust RV7 so that the CH-A and the CH-B levels from 2 MHz to 4.5 MHz are equal. (See Fig. 4-22.)

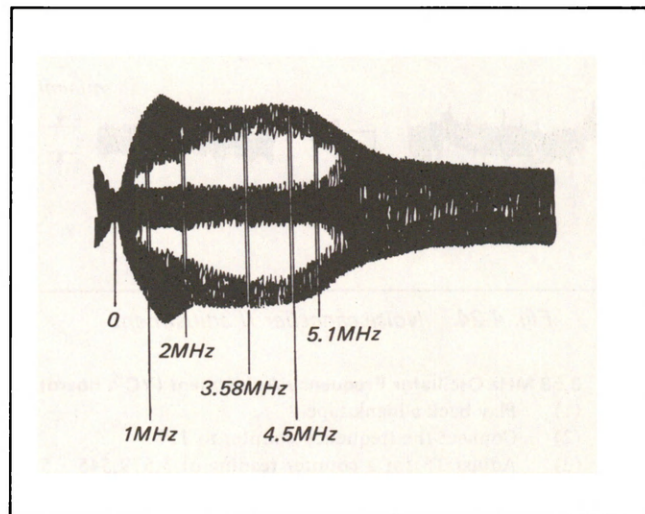


Fig. 4-22. Playback amplifier frequency characteristic adjustment

2. Dropout Compensator Sensitivity Adjustment (RP-1 board)

- (1) Play back a prerecorded tape known to have many dropouts.
- (2) Turn RV8 fully clockwise as viewed from the conductor side.
- (3) Turn RV8 counterclockwise slowly until the dropouts disappear and set RV8 to that point.
- (4) Rewind the tape and play it back. Check that the dropouts are compensated for at the places where the dropouts were observed in Step (2).

3. Playback Video Output Level Adjustment (YC-4 board)

- (1) Play back the color bar signal segment of the alignment tape.
- (2) Set the TRACKING CONTROL knob to the point where the best tracking is obtained.
- (3) Connect the oscilloscope to TP13.
- (4) Adjust RV5 for 1.15 Vp-p. (See Fig. 4-23.)

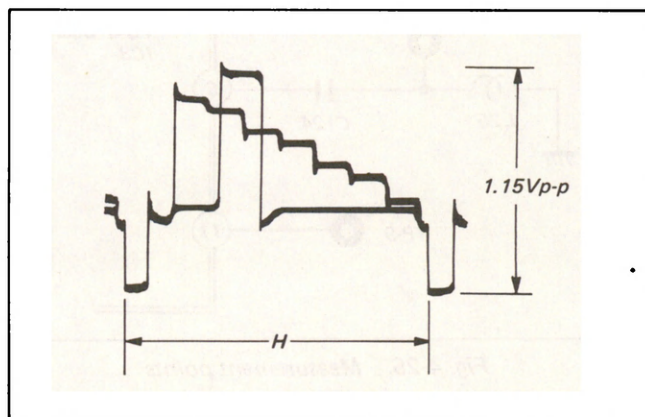


Fig. 4-23. Playback video output level adjustment

4. Noise Canceller II Adjustment (YC-4 board)

- (1) Playback the color bar signal segment of the alignment tape Beta II mode.
- (2) Connect the oscilloscope to TP12.
- (3) Adjust RV2 for minimum output. (See Fig. 4-24.)

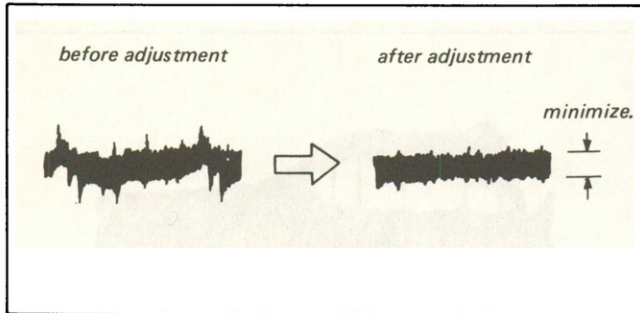


Fig. 4-24. Noise canceller II adjustment

5. 3.58 MHz Oscillator Frequency Adjustment (YC-4 board)

- (1) Play back a blank tape.
- (2) Connect the frequency counter to TP8.
- (3) Adjust T5 for a counter reading of $3,579,545 \pm 5$ Hz. (See Fig. 4-25.)

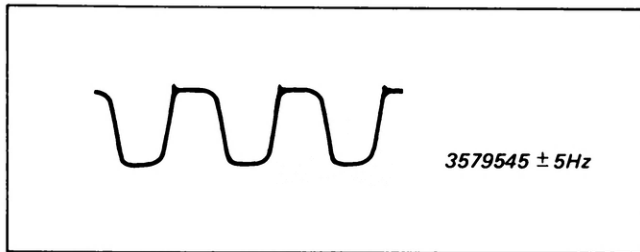


Fig. 4-25. 3.58 MHz oscillator output

6. VCO Free Frequency Adjustment and VCO Lock Check (YC-4 board)

- (1) Impress a $8.5 \text{ V} \pm 0.1 \text{ V}$ level to TP9 from the DC-regulated power supply.
- (2) Insert a blank tape and set up the PLAY mode.
- (3) Connect the frequency counter to TP10. (See Fig. 4-26.)

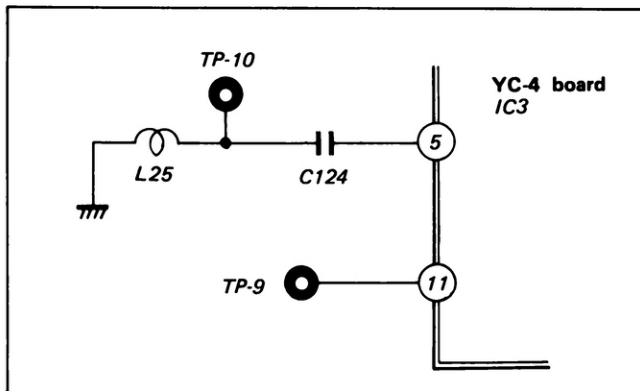


Fig. 4-26. Measurement points

- (4) Adjust RV9 for a counter reading of $688,373 \pm 1500$ Hz.

- (5) Remove the DC-regulated power supply connected in Step (1). Supply the color bar signal to the machine and set up the RECORD mode.
- (6) Connect the oscilloscope to pin 20 of IC3 and check that the waveform shown in Fig. 4-27 is obtained.

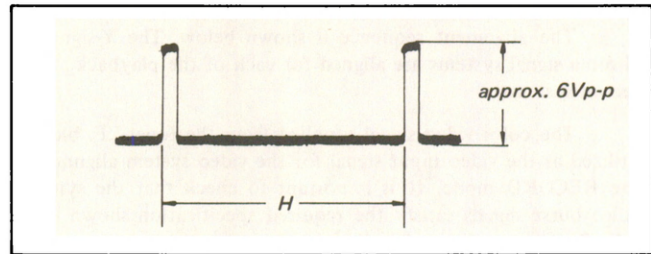


Fig. 4-27. Sync signal

- (7) Check that the frequency at TP10 is 688,373 Hz.
- (8) Connect the oscilloscope CH-1 probe to pin 20 of IC3 and the CH-2 probe to pin 23 of IC3. Check that the CH-1 and the CH-2 waveforms are as shown in Fig. 4-28.

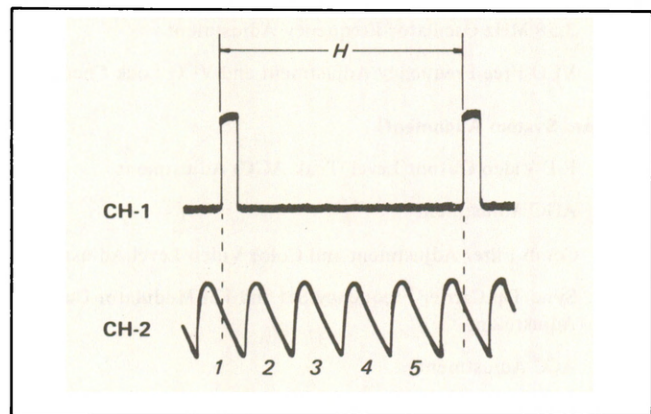


Fig. 4-28. VCO lock check

7. E-E Video Output Level (Peak AGC) Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Connect the oscilloscope to pin 24 of IC1.
- (3) Adjust RV18 for maximum level.
- (4) Adjust RV16 for 1.1 Vp-p. (See Fig. 4-29.)

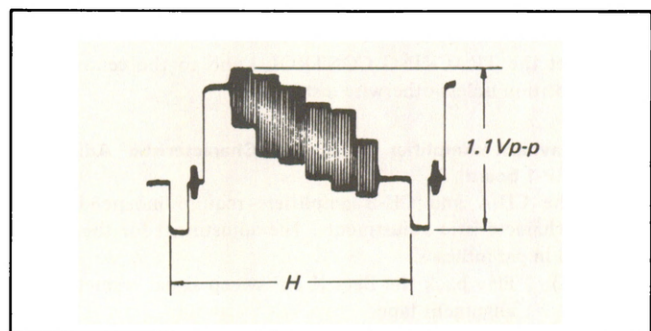


Fig. 4-29. E-E video output level (peak AGC) adjustment

- (5) Adjust RV18 for $1.06 \pm 0.1 \text{ Vp-p}$. (See Fig. 4-31.)

8. AGC Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Connect the oscilloscope CH-1 probe to pin 3 of IC1 and the CH-2 probe to pin 4 of IC1.
- (3) Check that the CH-1 and the CH-2 waveforms are as shown in Fig. 4-30.

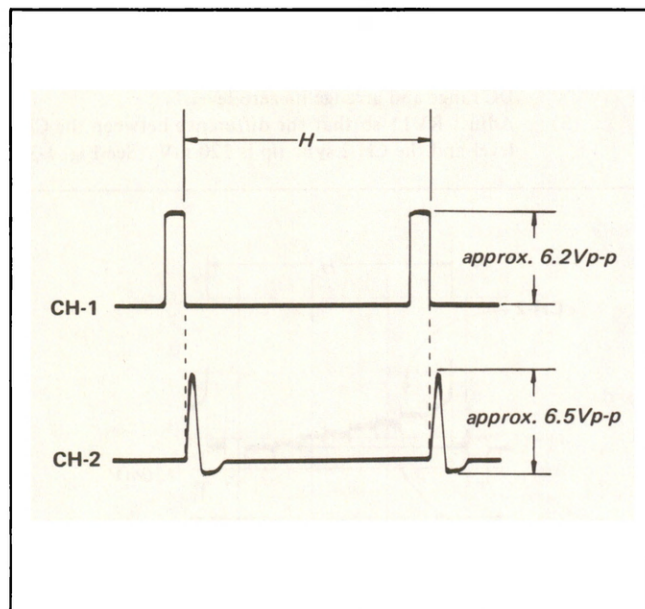


Fig. 4-30. AGC check

- (4) Connect the oscilloscope to pin 24 of IC1.
- (5) Adjust RV18 for 1.06 ± 0.1 Vp-p. (See Fig. 4-31.)

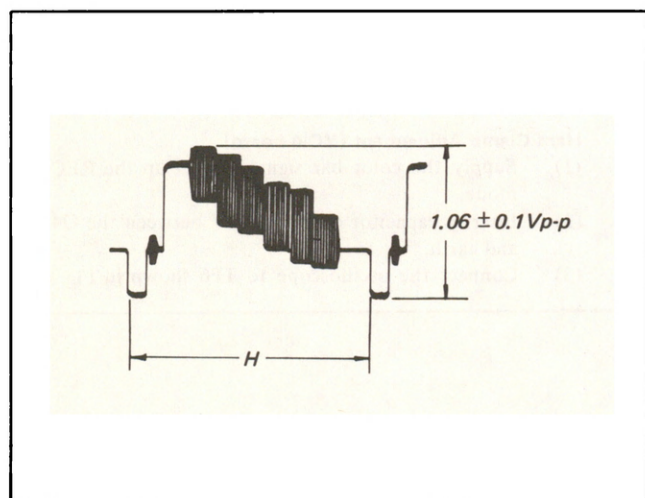


Fig. 4-31. AGC adjustment

9. Comb Filter Adjustment and Color Video Level Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Connect the oscilloscope to TP4.
- (3) Turn L12 and RV4 alternately to make the chroma signal minimum. (See Fig. 4-32.)

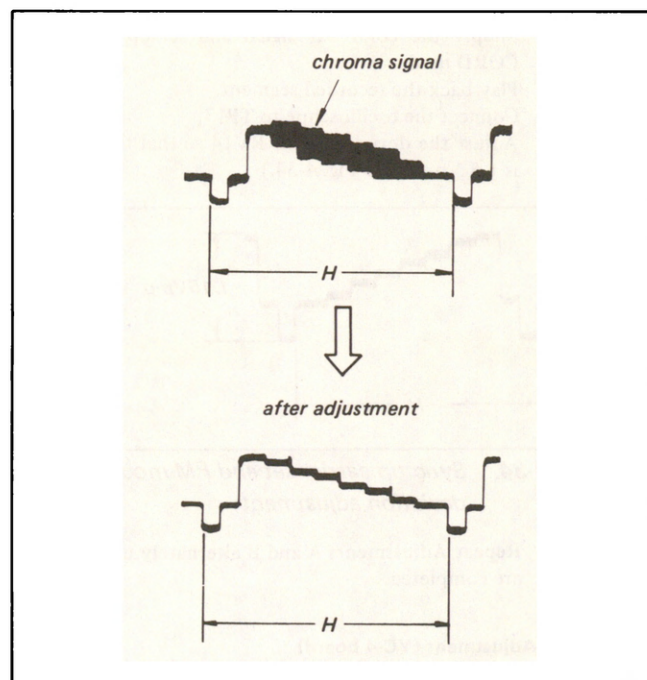


Fig. 4-32. Comb filter adjustment

- (4) Connect the oscilloscope CH-1 probe to TP3 and the CH-2 probe to pin 22 of IC1.
- (5) Adjust RV3 so that the CH-1 and the CH-2 waveform levels become equal. (See Fig. 4-33.)

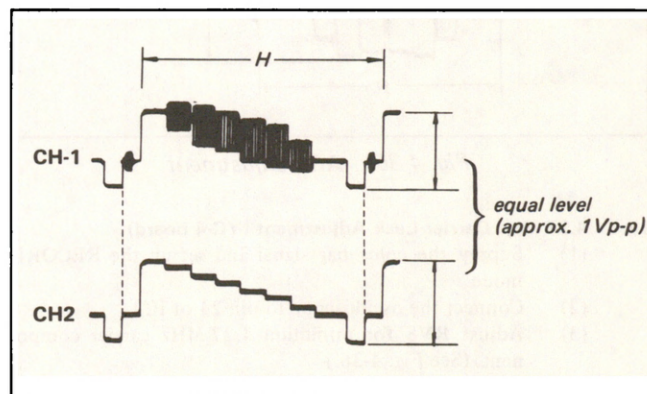


Fig. 4-33. Color video level adjustment

10. SYNC Tip Carrier Frequency Set and FM Modulator Deviation Adjustment (YC-4 board)

[Note prior to the adjustment]

Perform this adjustment after confirming that the Playback Video Output Level Adjustment, Adjustment 3, was completed. The following adjustments A and B should be performed alternately in this adjustment.

- | | |
|---|---|
| A | <ol style="list-style-type: none"> (1) Set up no signal state at the VIDEO IN terminal and set up the βII RECORD mode. (2) Inpress a 6.0 V to pin 3 of IC1 from the DC regulated power supply. (3) Connect the frequency counter to TP7. (4) Adjust RV15 for a counter reading of 3.6 ± 0.04 MHz. |
|---|---|

- (5) Supply the color bar signal and set up the β II RECORD mode.
- (6) Play back the recorded segment.
- (7) Connect the oscilloscope to TP13.
- (8) Adjust the deviation with RV14 so that the waveform is 1.5 Vp-p. (See Fig. 4-34.)

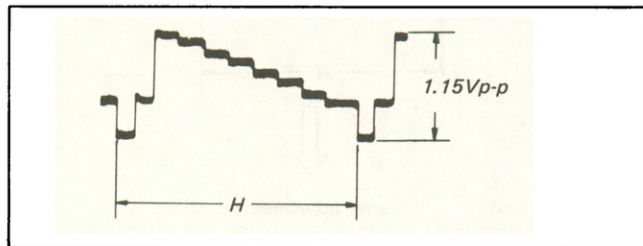


Fig. 4-34. Sync tip carrier set and FM modulator deviation adjustment

- (9) Repeat Adjustments A and B alternately until A and B are completed.

11. ACC Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Connect the oscilloscope to pin 11 of IC2.
- (3) Adjust RV7 for 0.85 Vp-p. (See Fig. 4-35.)

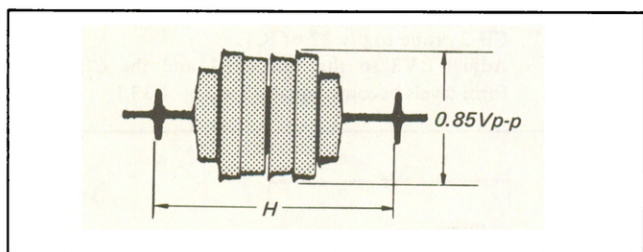


Fig. 4-35. ACC adjustment

12. 4.27 MHz Carrier Leak Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Connect the oscilloscope to pin 24 of IC2.
- (3) Adjust RV8 for minimum 4.27 MHz carrier component. (See Fig. 4-36.)

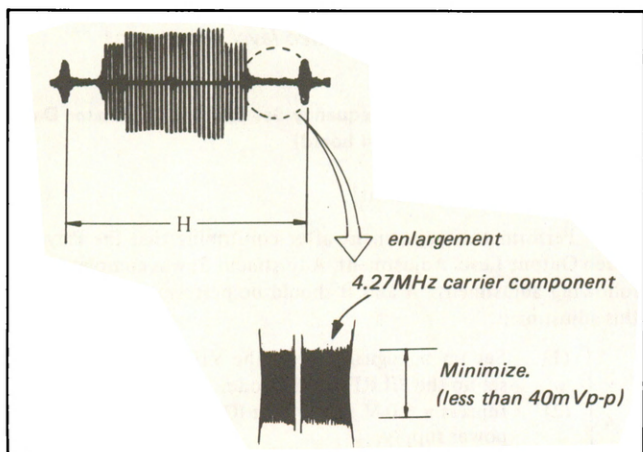


Fig. 4-36. 4.27 MHz carrier leak adjustment

13. White Clip Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Connect the VOM across R156.
- (3) Adjust RV12 for 0.3 V.

14. Dark Clip Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Connect the oscilloscope CH-1 probe to the Q13 collector and the CH-2 probe to TP5. Set the scope to the DC range and arrange its zero levels.
- (3) Adjust RV11 so that the difference between the CH-1 level and the CH-2 sync tip is 120 mV. (See Fig. 4-37.)

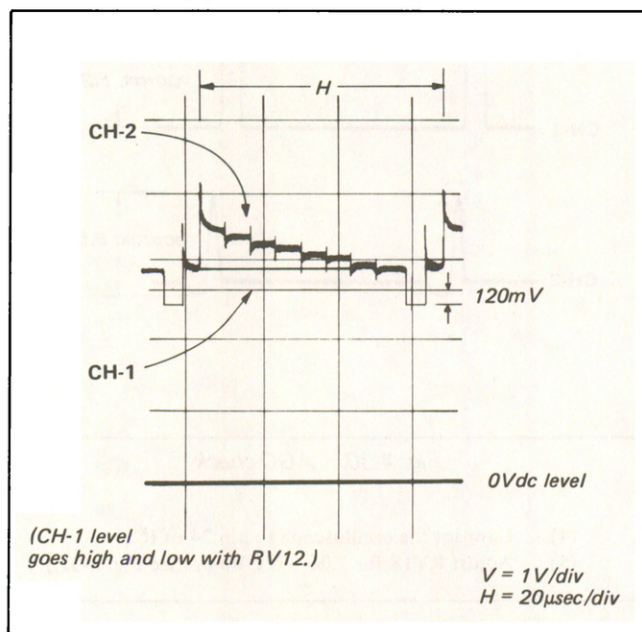


Fig. 4-37. Dark clip adjustment

15. Hard Clamp Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the RECORD mode.
- (2) Insert a capacitor of 47 μ F/16V between the Q4 base and earth.
- (3) Connect the oscilloscope to TP6 shown in Fig. 4-38.

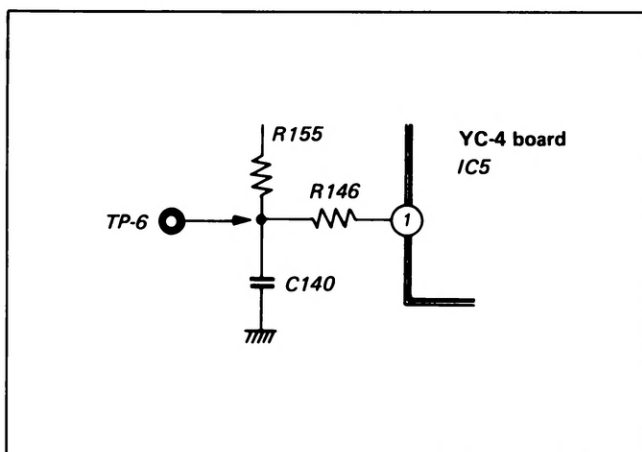


Fig. 4-38. Measurement point

- (4) Adjust RV10 to eliminate the level difference at every 1H. (See Fig. 4-39.)
Specification: less than 3 mV

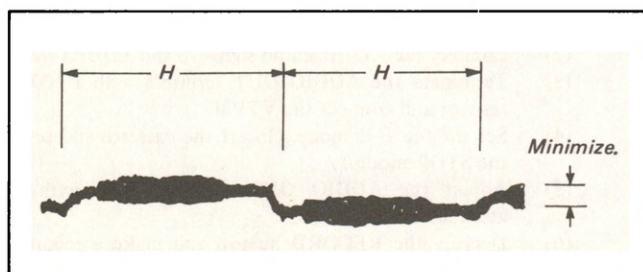


Fig. 4-39. Hard clamp adjustment

16. Y-FM Record Current Adjustment (RP-1 board)

- (1) Set up the no-signal condition at the VIDEO IN. Move "Camera/Tuner" switch to "Camera" position.
- (2) Set up the RECORD mode.
- (3) Connect CH-1 of scope to TP1 and CH-2 to TP2.

Note: Connect the ground lead of the oscilloscope for CH-1 only to VTR ground, such as TP7. Do not ground other probe ground lead, 0.2 μ sec/cm sweep, vert. at 0.05 V/cm, add CH-1 and 2.

- (4) Adjust RV1 for 125 ± 10 mVp-p. (See Fig. 4-40.)

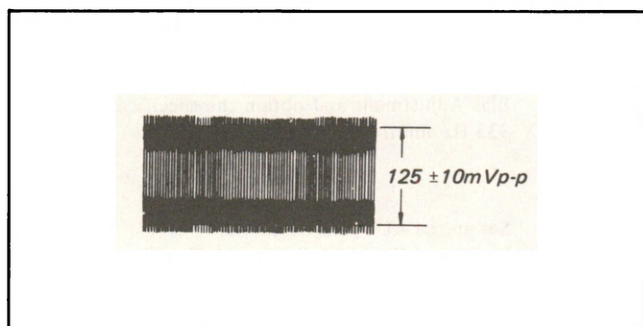


Fig. 4-40. FM record current adjustment

17. Chroma Record Current Adjustment (YC-4 board)

- (1) Supply the color bar signal and set up the STOP mode.
- (2) Connect the oscilloscope to the mid point of RV1.
- (3) Adjust RV1 for 380 ± 10 mVp-p. (See Fig. 4-41.)

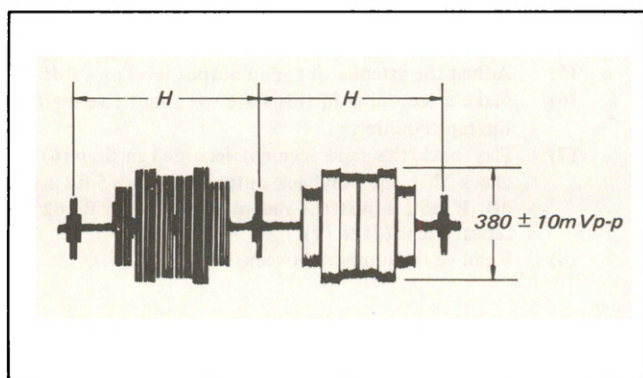


Fig. 4-41. Chroma record current adjustment

4-5. AUDIO SYSTEM ALIGNMENT

[Connection of Relative Equipment]

The connection of the equipment is shown in Fig. 4-42.

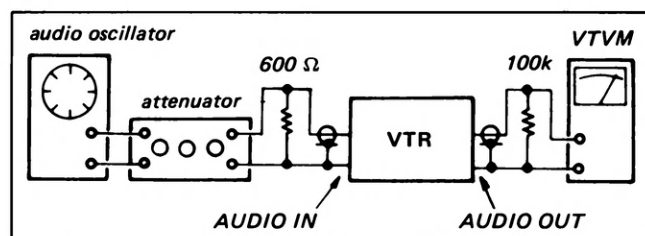


Fig. 4-42. Connection of audio test equipment

[Adjustment Mode]

All the adjustments of the audio system should be done in the β III mode. (It is not necessary to do them in the β II mode.)

[Adjustment Sequence]

1. Azimuth Adjustment
2. Playback Frequency Characteristic Adjustment
3. Playback Output Level Adjustment
4. Bias Oscillator Check
5. Bias Trap Adjustment
6. Record Bias Adjustment
7. Audio Dubbing Adjustment and Check
8. Record Current Adjustment
9. Overall Frequency Characteristic Check
10. AGC Operation Check
11. Overall S/N Ratio Check
12. Overall Distortion Check

1. Azimuth Adjustment

- (1) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (2) Play back the 5 kHz audio signal segment of the alignment tape.
- (3) Adjust the azimuth adjusting screw on the audio head for maximum output level. (See Fig. 4-43.)

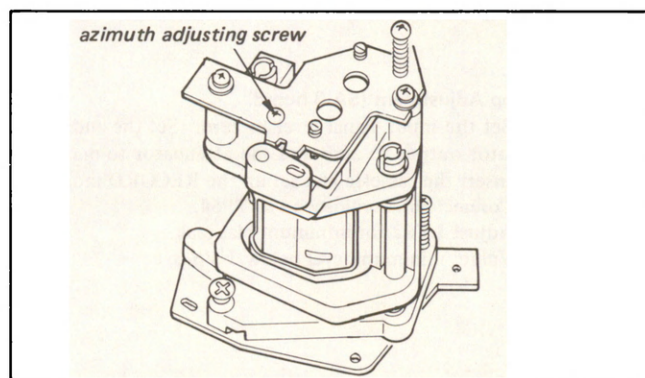


Fig. 4-43. Azimuth adjustment

2. Playback Frequency Characteristic Adjustment (SA-3 board)

- (1) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (2) Play back the 333 Hz segment of the alignment tape. Measure the output level and write it down.
- (3) Then play back the 5 kHz segment of the alignment tape.
- (4) Adjust RV61 so that the playback output level of the 5 kHz signal is -20^{+1}_{-0} dB in reference to the measured level of 333 Hz output level.
Example: If the 333 Hz output level is -5 dB, the 5 kHz output level should be adjusted to -25 dB.

Note: The level of the 5 kHz audio signal recorded on the alignment tape is -25 dB.

3. Playback Output Level Adjustment (SA-3 board)

- (1) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (2) Play back the 333 Hz audio signal segment of the alignment tape.
- (3) Adjust RV63 for a playback output level of -5 ± 1 dB.

4. Bias Oscillator Check (SA-3 board)

- (1) Set the input signal level to zero. (Set the audio oscillator output to zero and the attenuator to maximum.)
- (2) Insert the cassette and set up the RECORD mode.
- (3) Connect a microinductor of approx. 33 mH to the frequency counter and move the counter to T61 (oscillating transformer in the shield case). (See Fig. 4-44.)
- (4) Check that the oscillating frequency is 65 kHz $\pm$ 6.5 kHz.

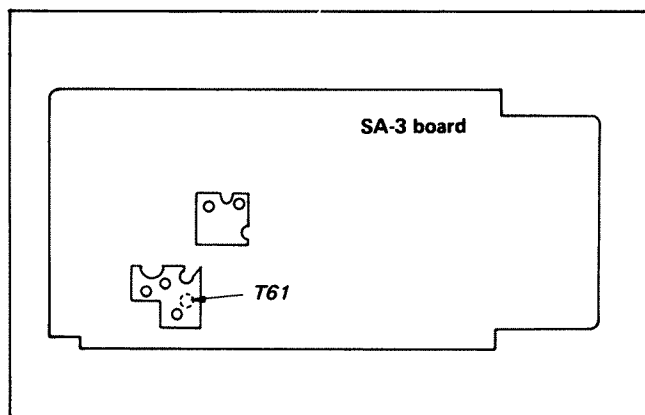


Fig. 4-44. Bias oscillator check

5. Bias Trap Adjustment (SA-3 board)

- (1) Set the input signal level to zero. (Set the audio oscillator output to zero and the attenuator to maximum.)
- (2) Insert the cassette and set up the RECORD mode.
- (3) Connect the oscilloscope to TP64.
- (4) Adjust LV62 for minimum bias leak.
Value: minimum level below 1 Vp-p

6. Record Bias Adjustment (SA-3 board)

Check that the playback frequency characteristic adjustment has been completed.

- (1) Connect TP61 and TP62 (GND) with a jumper so as to turn off the AGC operation.
- (2) Connect the 333 Hz audio signal to the AUDIO IN.
- (3) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (4) Set up the E-E mode. (Insert the cassette and set up the STOP mode.)
- (5) Adjust the AUDIO OUT terminal level with the attenuator for -25 dB.
- (6) Depress the RECORD button and make a recording for about five digits on the tape counter.
- (7) Change the audio signal to 5 kHz at -25 dB and make a recording for about five digits on the tape counter.
- (8) Play back the tape recorded in Steps (6) and (7). Measure the playback output levels of the 333 Hz and 5 kHz.
- (9) Check that the playback output level of the 5 kHz is $0^{+0.5}_{-0}$ dB in reference to the 333 Hz playback output level. If not, adjust the bias current with RV65 and repeat Steps (2) to (9) until the specification is satisfied.
- (10) Remove the jumper connected to TP61 after the adjustment.

7. Audio Dubbing Adjustment and Check

[Adjustment]

- (1) Set up the AUDIO DUB mode.
- (2) Perform Steps (1) to (10) of Adjustment 6, Record Bias Adjustment and obtain the specified levels of the 333 Hz and the 5 kHz signals.

[Check]

- (1) Set up the AUDIO DUB mode.
- (2) Perform Adjustment 9 "Overall Frequency Characteristic Adjustment" and confirm that the specification is satisfied.
- (3) Remove the jumper connected to TP61 after the adjustment.

8. Record Current Adjustment

- (1) Connect TP61 and TP62 (GND) with a jumper so as to turn off the AGC operation.
- (2) Supply the 333 Hz signal to the AUDIO IN terminal.
- (3) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (4) Set up the E-E mode. (Insert the cassette and set up the STOP mode.)
- (5) Adjust the attenuator for an output level of -5 dB.
- (6) Make a recording in this state for about five digits on the tape counter.
- (7) Play back the tape segment recorded in Step (6) and check that the playback output level is -5 dB to -6 dB. If not, adjust the record current with RV62 and repeat Steps (2) to (7).
- (8) Remove the jumper between TP61 and GND.

9. Overall Frequency Characteristic Check (SA-3 board)

- (1) Connect TP61 and TP62 (GND) with a jumper so as to turn off the AGC operation.
- (2) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (3) Connect the 333 Hz signal to the AUDIO IN terminal.
- (4) Set up the E-E mode. (Insert the cassette and set up the STOP mode.)
- (5) Adjust the audio line output level to -25 dB by the attenuator.
- (6) Press the RECORD button and make a recording for about five digits on the tape counter.
- (7) Repeat Steps (5) and (6) by switching the oscillator to 50 Hz, 100 Hz, 333 Hz, 3 kHz, 5 kHz and 7 kHz.
- (8) Play back the recorded portions and confirm that the output levels satisfy the specified values below.

Values: With reference to the 333 Hz playback output level.

50 Hz $+2.5$ dB
-13 dB

100 Hz $+2$ dB
-5 dB

3 kHz ± 2.5 dB

5 kHz ± 2.5 dB

7 kHz $+3$ dB
-15 dB

- (9) If not, readjust Adjustment 2 "Playback Frequency Characteristic Adjustment" and Adjustment 6 "Record Bias Adjustment".
- (10) Remove the jumper between TP61 and GND.

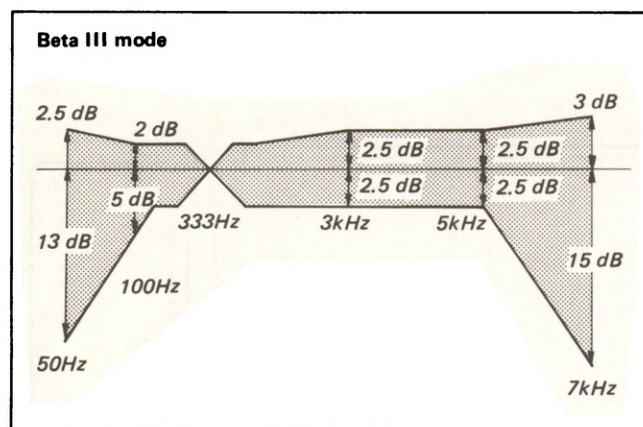


Fig. 4-45. Overall audio frequency characteristic adjustment

10. AGC Output Check

- (1) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (2) Supply the 333 Hz at -10 dB signal to the AUDIO IN terminal.
- (3) Set up the E-E mode. (Insert the cassette and set up the STOP mode.)
- (4) Check that the output level is -5 dB $\pm$ 2 dB.

11. Overall S/N Ratio Check

- (1) Terminate the AUDIO OUT terminal with a 100 k Ω resistor and connect the VTVM.
- (2) Set the input signal level to zero (set the audio oscillator output to zero and the attenuator to maximum.)
- (3) Insert the cassette and make a recording of about 10 digits on the tape counter.
- (4) Play back the recorded tape segment.
- (5) Check that the playback output level is less than -45 dB.

Note: The specified output level at the AUDIO OUT terminal is -5 dB.

12. Overall Distortion Check

- (1) Supply a 400 Hz signal at -10 dB to the AUDIO IN terminal.
- (2) Make a recording about 10 digits on the tape counter.
- (3) Connect the distortion meter to the AUDIO OUT terminal.
- (4) Check that the distortion is less than 4% when the tape segment recorded in Step (2) is played back.

4-6. TUNER BLOCK SYSTEM ADJUSTMENT

1. Tuner AGC Adjustment (TU-5 board)

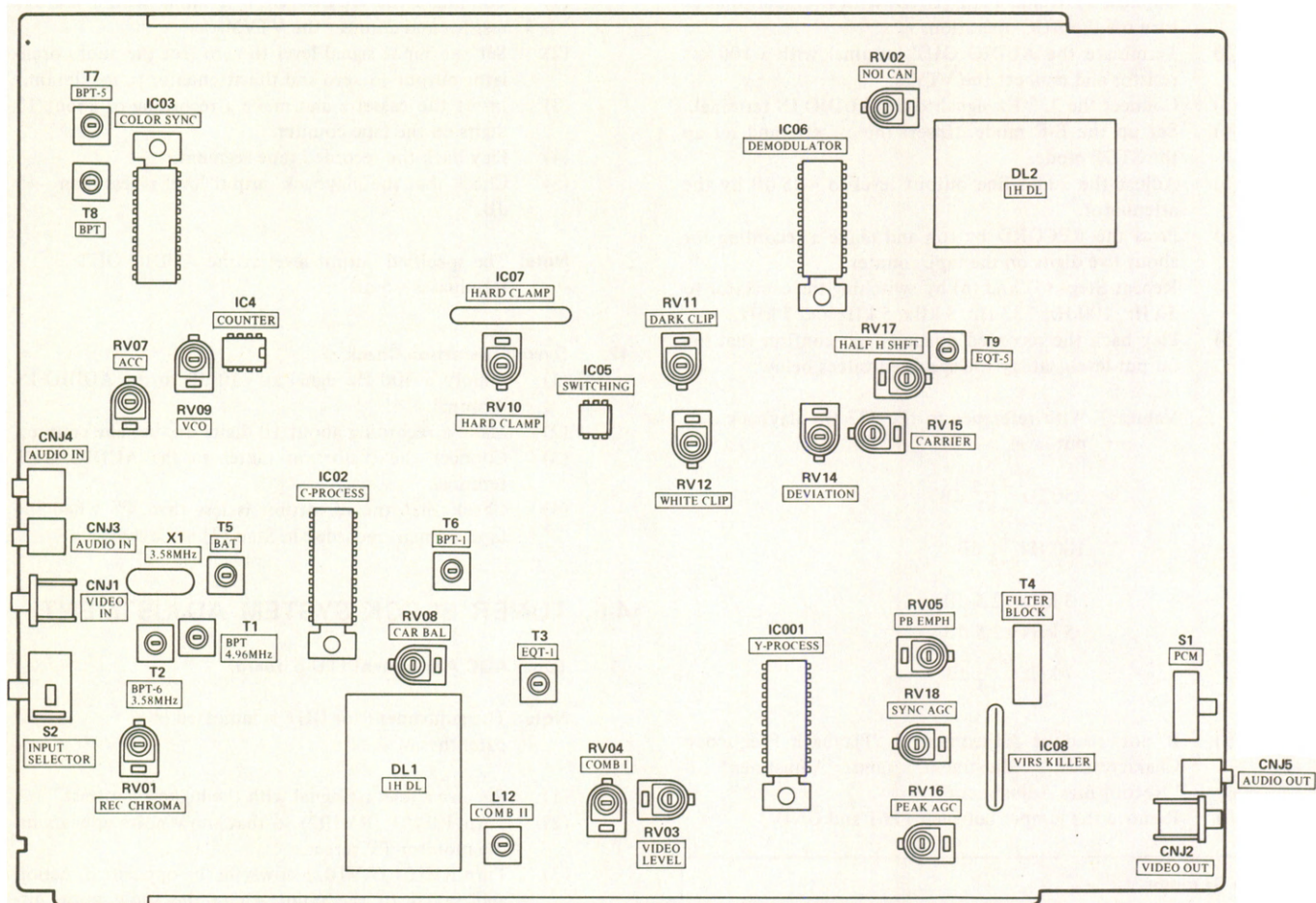
Note: The adjustment for UHF is indicated in parentheses.

- (1) Receive a telecast signal with the highest contrast.
- (2) Turn RV101 (RV102) so that snow noise appears on the monitor TV screen.
- (3) Turn RV101 (RV102) slowly in the opposite direction and set it to the point where the snow noise disappears.
- (4) Receive each channel and confirm that there are no intermodulation beat, picture distortion, nor snow noise.

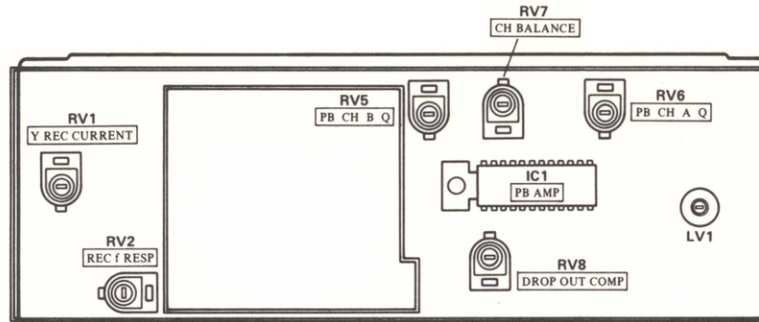
2. AFT Adjustment (IF-7 board)

- (1) Receive a telecast signal.
- (2) Turn off the AFT switch.
- (3) Turn the PRESET VR so that a 920 kHz beat appears and then turn it in the opposite direction. Set the VR to the point where the 920 kHz beat disappears.
- (4) If the 920 kHz beat appears or color vanishes, adjust T052.

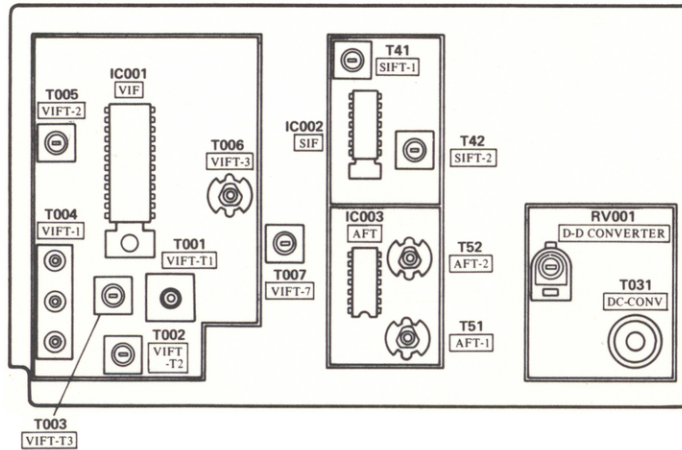
YC-4 BOARD LOCATION



RP-1 BOARD LOCATION



IF-7 BOARD LOCATION



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